Rehabilitation Programs Research
1 Objectives and research area

Clinical rehabilitation generally deals with complex patients with multiple co-morbidities and complications rather than with a single disease. Treatment is focused on enduring and coping with the disabilities of patients with multiple problems for which there is no curative intervention. As a consequence, multidisciplinary interventions characterize most treatment programs in clinical rehabilitation. Rehabilitation programs aim to improve patients’ mobility, independence in self-care, ability to communicate and ability to live independently and engage in productive activity. That is why our theme for the coming years will be ‘moving beyond disability’. With this theme we support and embrace the general theme of the University Medical Center Groningen (UMCG): ‘healthy aging’.

The central topic of the RPR program during the review period was ‘outcome and evaluation of interventions in patients with motor problems.’ It was the same central topic as during the last evaluation period.

The mission of the Center for Rehabilitation of the University Medical Center Groningen is to help people with disabilities to return to society, using the patient as our partner in the treatment.

We are the only university rehabilitation center (combination of the department of Rehabilitation Medicine of a university medical center and a rehabilitation center) in the Netherlands; this means that research, health care and education are in balance and that our rehabilitation treatment is based on the latest scientific views. In our research we focus on two groups of diagnoses:

- Disorders of extremities such as amputation of upper and lower extremities, and prosthetics and orthotics; and other problems of the extremities such as tendon or muscular problems
- Specific and a-specific (chronic) pain syndromes such as low back pain, complex regional pain syndromes or phantom pain.

We differ from other Dutch rehabilitation centers in the fact that we are offering continuity of cure and care, and that we carry out research in these diagnosis groups. High quality rehabilitation care combined with high quality research is our goal. We are involved in the patients’ treatment and their chain of care in order to enable a fluent transfer from hospital to rehabilitation center and finally to their home with coordination and continuity of that care. We want to be innovative and our aim is to provide the best rehabilitation care in the Netherlands.

During the last five years, some of our research has moved from rather descriptive research (epidemiology) towards explanatory research that calls for the development of experimental interventions, implementation of new treatments in clinical practice. This will hopefully result in a better quality of life for rehabilitation patients (translational research). We have attempted to achieve this by:

- Making the research on disablement and the treatment effectiveness more theory-driven
- Explicating and conceptualizing the content and underlying assumptions of experimental and established treatments
- Identifying implementation research problems at the beginning of the development of experimental treatments.
Over the past few years, we have encountered some problems due to a combination of under-staffing and the time-consuming nature of the kind of theory-driven research we conduct, which has somewhat limited our capacity to reach the intended level of output.

During the last evaluation, the committee felt that we had too many spearheads. Over the last few years it became clear that three spearheads for a relatively small department were too many to focus on. This could ultimately result in less knowledge and less depth of knowledge and therefore result in less chance of securing more funding.

We decided to combine the spearheads ‘amputation, prosthetics and orthotics of the lower extremity’ and ‘arm and hand problems’ into ‘disorders of the extremities.’ This was suggested during the last audit five years ago.
2 Composition of the research program

Strategy and policy

The central topic of the RPR program was 'outcome and evaluation of interventions in patients with motor problems'. Outcome research in rehabilitation can be defined as research intended to objectify the sustained impact of rehabilitative strategies and treatments on the everyday life of patients with disabilities due to disease or a severe accident. We recently had a change in management of the department of Rehabilitation Medicine and the rehabilitation center, and even more changes are in progress. Our strategy and policy at this moment is still to combine three spearheads into two spearheads. In this way we hope for more intensive interaction and exchange of ideas and knowledge between junior and senior researchers. Several times a year, all the researchers with one focus come together. Short presentations of ongoing research are given and researchers exchange knowledge, views and the actual state of their research in an informal way. These meetings are presided over by one of the senior researchers. By combining the two spearheads 'amputation, prosthetics and orthotics of the lower extremity' and 'arm and hand problems', we are becoming more focused and we think that we will receive more external funding for our research. By combining these spearheads, we will also present a better face externally (also good for public relations) regarding research. We are planning a mission and vision meeting at the end of 2009 / beginning of 2010 regarding research. This meeting will be presided over by an emeritus professor of our university, and established researchers, PhD students, and managers will attend; researchers from outside the department will also be invited. In this way we will attempt to refocus and hopefully to start off with an updated research strategy for the future.

Research input by type of appointment

Table 1 provides a description of research staff. An explanation of the way research fte’s are computed is given in chapter 1.

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Research staff</th>
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<tbody>
<tr>
<td></td>
<td>2003</td>
</tr>
<tr>
<td>Tenured staff</td>
<td>fte</td>
</tr>
<tr>
<td>Professor</td>
<td>0.60</td>
</tr>
<tr>
<td>Associate prof</td>
<td>0.32</td>
</tr>
<tr>
<td>Assistant prof</td>
<td>1.17</td>
</tr>
<tr>
<td>Total tenured</td>
<td>2.09</td>
</tr>
<tr>
<td>Non tenured staff</td>
<td></td>
</tr>
<tr>
<td>Post doc</td>
<td>0.90</td>
</tr>
<tr>
<td>PhD</td>
<td>4.07</td>
</tr>
<tr>
<td>Total staff</td>
<td>7.06</td>
</tr>
</tbody>
</table>
Table 2 provides an overview of the various types of PhD students, as well as their progress.

<table>
<thead>
<tr>
<th>Table 2</th>
<th>PhDs, types and progress</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2003</td>
</tr>
<tr>
<td>Total</td>
<td>10</td>
</tr>
<tr>
<td>Type:</td>
<td></td>
</tr>
<tr>
<td>AIO, MD/PhD</td>
<td>4</td>
</tr>
<tr>
<td>Bursary</td>
<td>1</td>
</tr>
<tr>
<td>Clinical</td>
<td>1</td>
</tr>
<tr>
<td>Ext. funding</td>
<td>2</td>
</tr>
<tr>
<td>External</td>
<td>3</td>
</tr>
<tr>
<td>Progress:</td>
<td></td>
</tr>
<tr>
<td>Graduated</td>
<td>3</td>
</tr>
<tr>
<td>In progress</td>
<td>7</td>
</tr>
<tr>
<td>Stopped</td>
<td>2</td>
</tr>
</tbody>
</table>

Research input by sources of funding

In addition to the internal grants (for fellows) and the large external grants (ZonMw and Industry), the RPR has received many small grants (between € 5.000,- and € 20.000,-) from foundations, such as: Foundation Beatrixoord, Foundation Nuts Ohra, Foundation OIM, Foundation of Orthopedic Shoe Technicians, Anna Fonds, JK de Cock Foundation.

These grants enable us in particular, apart from covering salaries, to pay additional expenses, such as attending congresses, for many of our young researchers, who are both externally and internally funded PhD students.

Table 3 provides the proportion between internal funding (‘tenured staff’) and externally obtained resources (‘other research input’). An overview of large projects acquired will be presented hereafter in section 6: Earning capacity.

<table>
<thead>
<tr>
<th>Table 3</th>
<th>Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2003</td>
</tr>
<tr>
<td></td>
<td>€</td>
</tr>
<tr>
<td>Tenured staff</td>
<td>180.275</td>
</tr>
<tr>
<td>Other research input</td>
<td>178.004</td>
</tr>
<tr>
<td>Total</td>
<td>358.279</td>
</tr>
</tbody>
</table>
3 Research environment and embedding

Disorders of the extremities
’Disorders of the extremities’ encompasses research into the field of prosthetics and orthotics of the upper and lower extremities. In addition, sports injuries and problems after hand surgery are also studied.

Within the UMCG, there are a multitude of good working relationships with the department of Human Movement Sciences, Orthopedic Surgery, Sports Medicine, Plastic and Reconstructive Surgery, Neurology, Neurosurgery, Oral and Maxillofacial Surgery, Vascular Surgery, and Oncology Surgery. Over the last few years, we have established a further good working relationship with the Hanze University Groningen (a university of applied sciences that trains physical therapists, nurses, speech therapists, etc.). We hope to establish a professorship in 2010 so as to continue, strengthen and intensify our relationship with this university.

We have a good scientific output regarding both topics of the two new spearheads. Regarding the first spearhead, ’disorders of the extremities’, we are not only acknowledged in the Netherlands but also abroad. Nationally, in the field of amputation, prosthetics and orthotics, we collaborate with the St. Maartenskliniek in Nijmegen (Dr H van der Linde), Het Roessingh Research and Development Center Enschede (Prof JS Rietman), the Rehabilitation Center De Vogellanden Zwolle (ECT Baars, MD), and the Isala Kliniek Zwolle (Dr C Emmelot). In the field of ’arm and hand problems’, we collaborate with many additional rehabilitation centers, such as ones in Utrecht, Rotterdam, Nijmegen, Zwolle, Hoensbroek, etc.

With respect to this spearhead in international terms, we play a leading role in the International Society for Prosthetics and Orthotics (ISPO). The program leader, Prof JHB Geertzen, is at this moment president elect of ISPO and will in 2010 become the president. He has received a grant of € 200.000,- from the Association for Medical Specialists in the Netherlands for writing an evidence-based guideline for the period between the first thought of amputating a limb to the prescription for the first limb prosthesis. This guideline will be national, multidisciplinary, and ’Evidence-based Development Guidelines’ (EBRO), based. This project will be finished by the end of 2010. At the same time Prof Geertzen has received a grant from the ISPO to rewrite this guideline for the international community. Finally, he has received a grant of more than USD 3 million, also awarded to the ISPO, from USAID / Leahy War Victims Fund for the education of prosthetists, orthotists, and orthopedic shoe technicians all around the world, especially in non-industrial countries, and to set up long-distance learning projects for those prosthetists and orthotists so as to ensure continuous education for these professionals. Internationally, there are also working relationships with Germany and Austria (Otto Bock), Manchester (UK) and Vancouver (Canada).

Pain
Our research with respect to pain concentrates mainly on ’chronic low back pain’ and especially on ’return to work’ with low back pain. In addition to research into low back pain, we focus on phantom pain and complex Type I regional pain syndromes.

Locally we have a good working relationship with the Pain Center (department of Anesthesiology). Adding to this strong relationship, a few years ago we started a Spine Center together with the departments of Neurosurgery, Neurology, Anesthesiology, and Orthopedic Surgery. Patients with back pain are seen at the same time by these departments. A lot of data have come together which will provide a unique publishing opportunity.

Nationally we have very good working relationships with Revalidatie Friesland and the other three Dutch Rehabilitation Centers recognized by the Dutch Government as Development Center for Pain Rehabilitation (Ontwikkelcentrum Pijn in de Revalidatie - OPR): Rehabilitation Center Rijndam (Rotterdam), Rehabilitation Center Roessingh (Enschede) and Rehabilitation Center Hoensbroeck (Hoensbroeck). In the field of pain research, the program leader, prof
Geertzen, is the chairman of the research team in the Netherlands that deals with all research in the field of rehabilitation of low back pain, known as ‘Low Back Disability’ (LoBaDis). In the spearhead of pain research, the center for rehabilitation has now been acknowledged by the Dutch central government through a large grant of €800,000,- for the development of the theme ‘Pain in Rehabilitation’ (OPR). Currently we are now remodeling the OPR to create an Innovation Center for Pain and Rehabilitation. The main focus in this spearhead is ‘return to work with pain’.

The spearhead of pain research encompasses international collaboration with Canada, Switzerland, Finland and the United States regarding Functional Capacity Evaluations.

To ensure the academic careers of some principal investigators of the Center for Rehabilitation, we are taking steps to make sure that they will be ‘saved’ for our department. In collaboration with the Dean, we have made strict arrangements for their academic careers. Finally, we are establishing better and more intensive working relationships with the departments of Human Movement Sciences, Sports Medicine and Orthopedic Surgery in order to establish a center called Sports and Handicap. Dr R Dekker will be in charge of his field of research which will fall under the spearhead of ‘disorders of extremities.’ We have just appointed four Ubbo Emmius scholarship PhD students (UE-PhD students) to ensure a powerful start for this new topic. This topic will also fit in very well with the general theme of the UMCG: ‘healthy aging.’
4 Quality and scientific relevance

Most relevant results
In addition to the grants mentioned in table 5, one other grant deserves special mention: dr Van der Sluis, together with the department of Human Movement Sciences, was awarded a grant of €400,000,- by the orthopedic industry. This was one of the first grants from this industry and was awarded after the installation of the Orthopedic Academy (a joint venture) (Otto Bock).

The department has also been involved in writing the first evidence-based guidelines in diagnosis and treatment of Complex Regional Pain Syndrome Type I. This process took two years and involved many medical (13), and para-medical (3) specialists as well as the Netherlands Association of Posttraumatic Dystrophy Patients. The process was lead by the Dutch Institute for Healthcare Improvement (CBO) and paid for by the General Medical Association (OMS). It has resulted in Dutch guidelines for medical doctors as well as for para-medical professionals such as physical and occupational therapists, and psychologists. These are the first evidence-based guidelines for Complex Regional Pain Syndrome (CRPS) in the world. They have been published in book form as well as in the form of a large patient leaflet, and both have been translated into English and are available through many Dutch medical associations, on www.CBO.nl and also through patient organizations in Canada and the USA. There was a peer-reviewed paper in the Nederlands Tijdschrift voor Geneeskunde, and a paper has been submitted to an international journal (accepted with minor revisions).

In the years to be evaluated, 2003-2008, sixteen theses have been published in which individuals from the RPR were involved, either as primary author, or as supervisor, or as co-supervisor. Also in the last five years, two individuals from this program passed the threshold of 100 PubMed publications: prof PU Dijkstra and prof JHB Geertzen.

Key publications


**Most important books / book chapters**


- Geertzen JHB, Perez RSGM, Dijkstra PU, Kemler MA, Rosenbrand CJGM, (eds.). Richtlijn Complex Regionaal Pijn Syndroom (Evidence-Based Guidelines for Multidisciplinary Treatment and Diagnosis of Complex Regional Pain Syndrome Type I). Alphen a/d Rijn, Van Zuiden Communications BV, 2006.

No leg to stand on? The motor skills of leg amputees

**Body image and prosthetic feet**
Before being able to start devising tests, Curtze first examined how people’s body image changes after undergoing a limb amputation. Nineteen patients were shown a picture of a rotated foot and asked whether it was a left or a right foot. Conclusion: even years after an amputation, patients still have an intact body image, comparable with that of healthy people.

Curtze then wrote an article about the properties of prosthetic feet. These are essential to amputees, as they must ensure that the person can walk efficiently and keep his/her balance. Curtze studied the roll-over characteristics of a number of prosthetic feet, combined with various types of shoes (sports shoes, hiking boots and men’s leather shoes). She found little variation in prosthetic feet, particularly when combined with different types of shoe. And yet the feet can feel very different when used by different patients. Curtze therefore concluded that the properties of prosthetic feet should not be studied independently, but always within a context that is important to the patient. It is all about the patient’s abilities and motivation, she explains.

**Testing motor skills**
Curtze is currently examining a number of tests designed to measure patients’ motor skills. Most of the tests have never been used on amputees before, such as test whereby the patient is asked to walk across an uneven surface. Curtze designed a special ‘stumble rug’ for this test, comprising a piece of carpet covering randomly arranged blocks of wood designed to resemble a bumpy road. The test is intended to shed light on the walking strategies patients use to prevent themselves from falling while crossing the rug. Another test she uses has been used on amputees in the past: the timed up & go test. In this test patients are timed standing up from a standard chair and walk a distance of approximately 3 meters, turn around and walk back to the chair and sit down again. Curtze has added another two tests to the package: a balance test and a test whereby the patient has to walk on a slope. In the balance test, the patient is asked to perform one-leg stance. Curtze then examines the strategies patients use to maintain their balance, like moving their arms in relation to their body for example.

In October 2005, Carolin Curtze started her PhD research project into prosthetic foot properties and motor skills in patients who have had a lower leg amputated. She is the first ever foreign scholarship student to work at the Rehabilitation Center in the UMCG. In a previous research project, Helco van Keeken and Aline Vrielings studied the walking and balancing strategies of lower leg amputees. Curtze is continuing along this path. She initially chose to study the relationship between the characteristics of the patient and the properties of the prosthesis in the form of an intervention study, but it soon became clear that no suitable tests for measuring motor skills existed so she modified her research to develop such a test.
The tests are ultimately intended to represent reality as closely as possible. Curtze will only be able to draw conclusions about the strategies patients use to keep their balance in everyday life if she is able to imitate reality. She then wants to compare the strategies she identifies with those of healthy participants. The results will be used to devise training programs and aids for amputees, specifically aimed at preventing falls. It is hoped that this will drastically improve the quality of this group of patients’ lives.

Germany on the map...
So this intervention study eventually turned into research for developing tests. But this is not the only aspect of the study that has changed. Curtze’s initial intention had been to work closely with the university in Wuppertal (Germany). This relationship has now diminished into sporadic consultation, with the majority of her work being carried out in the Netherlands. Yet German influences are still evident in her research: some of the healthy participants Curtze has examined live in her German home town.

The factor that finally made Curtze chose the Netherlands for her research was the difference between the PhD systems in the two countries. To obtain a PhD title in Germany, you have to write a thesis, which you must then try to have published afterwards. In the Netherlands, you publish articles during the course of the PhD project itself. This implies more feedback on your work and greater opportunities for scientific development. There is no fixed period for a PhD project in Germany, whereas this is laid down at the start in the Netherlands.

Alongside these considerations, Curtze was also keen to spend time working abroad. When her German supervisor drew her attention to the vacancy, she did not hesitate. She has not been homesick, but is not yet sure whether she intends to stay in the Netherlands after obtaining her PhD title in a year’s time.

Publications

Conference Contributions
5 Quantity of scientific output

Publication strategy
We follow the UMCG policy regarding publication strategy as closely as possible. We always evaluate the balance of visibility vs impact factor. The first goal is to publish in journals with a high impact factor, but that is not always good for visibility. The journal where we try to publish our papers depends on the topic of the study. In the field of prosthetics and orthotics, there are not many journals with a high impact factor. Sometimes we consider the audience as more important than the impact factor. As a rule the impact factor of journals in the field of rehabilitation research is not as high as the impact factor for other medical specialties. In the process of writing scientific papers this is always the consideration we have to make. Our thought and hope is that the more we publish the more we will grow in the ranks of the top thirty percent, by offering better studies (two spearheads). The body of knowledge within the spearheads (by focusing on two spearheads) will grow and thus support the basis of our research, and will probably also lead to more output in the top thirty percent.

Number of publications
Table 4 provides a description of several types of research output. An explanation of the types distinguished is given in chapter 1. Table 4 also gives the average number of top-30% articles per tenured staff member.

Table 4 Output

<table>
<thead>
<tr>
<th></th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
</tr>
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<tbody>
<tr>
<td>n %</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>ISI articles</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>top-30%</td>
<td>14</td>
<td>18</td>
<td>14</td>
<td>20</td>
<td>16</td>
<td>31</td>
</tr>
<tr>
<td>other</td>
<td>10</td>
<td>11</td>
<td>16</td>
<td>13</td>
<td>13</td>
<td>19</td>
</tr>
<tr>
<td>Total</td>
<td>24</td>
<td>29</td>
<td>30</td>
<td>33</td>
<td>29</td>
<td>50</td>
</tr>
<tr>
<td>(top-10%)</td>
<td>(2 8)</td>
<td>(9 31)</td>
<td>(6 20)</td>
<td>(7 21)</td>
<td>(6 20)</td>
<td>(15 30)</td>
</tr>
<tr>
<td>Other refereed articles</td>
<td>5</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td>Book chapters</td>
<td>5</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>14</td>
</tr>
<tr>
<td>Books</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>PhD theses</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SHARE theses</td>
<td>2</td>
<td>5</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Others, (co-)supervised</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td># Top-30% articles per tenured staff member</td>
<td>2.7</td>
<td>3.4</td>
<td>2.6</td>
<td>4.0</td>
<td>3.4</td>
<td>6.2</td>
</tr>
</tbody>
</table>
6 Earning capacity

We have managed to receive many small grants. So, to that extent, we have been successful; however, we are striving for larger grants. Rehabilitation is a medical specialty with professionals whose predominant aim is to treat and help people. There are not that many researchers in this field. Fund-raising for rehabilitation is, in most cases, a difficult area. However, we do find a lot of small foundations willing to fund the majority of our research. These foundations include, for instance, the Beatrixoord Foundation, the OIM Foundation, and other small regional and superregional foundations. Focus on two spearheads should increase knowledge and expertise in the fields, which in turn should increase our ability to raise funds.

Rehabilitation is not a charismatic field, and there are relatively few funding opportunities. It is always difficult to be competitive with other medical specialties in securing the larger grants.

Table 5 provides a list of the major research projects (> € 100,000), classified by funder.

<table>
<thead>
<tr>
<th>Major projects acquired</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ZonMw</strong></td>
</tr>
<tr>
<td>• Determinants of functional recovery of gait after stroke</td>
</tr>
<tr>
<td>• Stump skin problems of the lower limb amputee</td>
</tr>
<tr>
<td>• The child with cerebral paresis</td>
</tr>
<tr>
<td>• Program innovation in chronic low back pain rehabilitation: A transform project</td>
</tr>
<tr>
<td><strong>Stichting Instituut GAK</strong></td>
</tr>
<tr>
<td>• Functional capacity evaluation: Norm references and utilities</td>
</tr>
<tr>
<td>• Working with pain: Determinants of persons with non-specific chronic pain functioning well in work</td>
</tr>
<tr>
<td><strong>CVZ</strong></td>
</tr>
<tr>
<td>• Development of guidelines for diagnosis and prescription of orthopedic orthoses</td>
</tr>
<tr>
<td><strong>Insurance Company NUTS/OHRA</strong></td>
</tr>
<tr>
<td>• Preventive positioning and electrical stimulation of the hemiplegic arm</td>
</tr>
<tr>
<td><strong>Center for Rehabilitation</strong></td>
</tr>
<tr>
<td>• Program-improvement in prosthetic rehabilitation</td>
</tr>
<tr>
<td>• RUG / UMCG</td>
</tr>
<tr>
<td>• Inventarisation of essential factors in the fit of the transtibial prosthesis</td>
</tr>
<tr>
<td>• Sport and amputees</td>
</tr>
<tr>
<td>• The interaction of prosthetic foot properties and individual motor capacity impact on motor performance</td>
</tr>
<tr>
<td>• Rehabilitation of the elderly amputee</td>
</tr>
<tr>
<td>• Self management in rehabilitation practice</td>
</tr>
<tr>
<td>• Rehabilitation and the ability to perform activities at home and at the workplace in patients with chronic low back pain</td>
</tr>
<tr>
<td>• Combined clinical and home rehabilitation for stroke patients</td>
</tr>
<tr>
<td>• The added value of a problem-solving training on the duration of sick leave and work status in patients with an acute traumatic hand injury: A randomised controlled trial</td>
</tr>
<tr>
<td>• Functional capacity evaluation in patients with chronic low back pain: Reliability and validity</td>
</tr>
<tr>
<td>• Amputation and sexuality</td>
</tr>
</tbody>
</table>
7 Academic reputation

In this section, a summary will be given of our ‘international position and recognition.’ The prominence of the program research staff will be demonstrated.

Prizes and awards
• Delsys Prize for his research regarding the normal and abnormal EMG profiles in walking (2005, AL Hof)
• First Prize Award for a poster during the symposium of the Gesellschaft für Orthopädische-Traumatologische Sportmedizin, Munich (2005, A Gokeler)
• Best Abstract Award of the Allied Respiratory Professionals, European Respiratory Society, Copenhagen (2005, G Reinsma)
• Honorary member of ISPO the Netherlands (2005, JHB Geertzen)
• The ‘Zilveren Balk’ of the Dutch Society for Rehabilitation Medicine, the Netherlands (2005, JHB Geertzen)
• Poster award prize VRA BSRM; Edinburgh, Scotland (2006, GM Rommers)
• The Center for Rehabilitation was appointed by the Dutch National Government as a Development Center for Pain Rehabilitation (2007)
• Poster award Dutch Society for Medical Education (2008, M Tepper)
• Third prize residents Rehabilitation Medicine, Bruges, ESPRM (2008, N Hulsman)
• Poster award prize, Bruges, ESPRM (2008, AP Hodselmans)

Invitations for major lectures and conference presentations

Prof JHB Geertzen
• Amputation and pain adaptation. Farewell symposium prof LNH Göeken, June 24, 2003, Groningen
• Rehabilitation of CRPS-I. Consensus Workshop Taxonomy and Algorithm, August 31, 2003, Budapest, Hungary
• Restoring function in patients with CRPS-I. New thinking in the diagnosis and treatment of CRPS-I, September 1, 2003, Budapest, Hungary
• Phantom pain and quality of life, IV Congreso Latinamericano ISPO, October 20, 2003, Buenos Aires, Argentina
• Consumer satisfaction, IV Congreso Latinamericano ISPO, October 21, 2003, Buenos Aires, Argentina
• Instructional course ‘Skin and stump problems of the lower limb amputee’, 11th World Congress International Society for Prosthetics and Orthotics, August 1, 2004, Hong Kong
• Phantom pain; a threat to quality of life, 11th World Congress International Society for Prosthetics and Orthotics, August 2004, Hong Kong
• Education program Rehabilitation Medicine for residents in the Netherlands. Precongress meeting ‘Organization and Education Rehabilitation Medicine’ May 2, 2006, Iguazu, Argentina
Rehabilitation Medicine from the perspective of the University. Precongress meeting ‘Organization and Education Rehabilitation Medicine’, May 3, 2006, Iguazu, Argentina

- **Syndrome simpatico reflejo (Complex regional pain syndrome type I).** XVIII Congreso Argentino de la Sociedad Argentina de Medicina Fisica y Rehabilitacion, XI Jornadas del Conso Sur, IV Congreso Hispano Argentino, May 4, 2006, Buenos Aires, Argentina

- **Desarrollo de algoritmos y pautas para la prescription de orthesis (Algorithm in prescription of orthoses in CVA).** III Curso SPO Internacional de Actualizacion en la Atencion y Equipamiento del ACV y sus secuelas. May 5, 2006, Buenos Aires, Argentina

- **Patologia de piel del munion (Stump and skin problems).** XVIII Congreso Argentino de la Sociedad Argentina de Medicina Fisica y Rehabilitacion, XI Jornadas del Conso Sur, IV Congreso Hispano Argentino, May 6, 2006, Buenos Aires, Argentina

- **Physical and occupational therapy. Evidence-based guidelines in CRPS.** 7th Physiatric Summer School CRPS – Current Diagnosis and Treatment, September 1, 2006, Helsinki, Finland

- **Prosthesis and sports: a difficult combination.** 27. Fort- u.Weiterbildungskurs Technische Orthopädie biomechanik. Sport mit Handicap; orthopädische, muskelfysiologische und physiotherapeutische Aspekte, March 9, 2007, Klinik u. Poliklinik für Technische Orthopädie Münster, Germany

- **Moving beyond disability.** 12th World Congress of the International Society for Prosthetics and Orthotics, July 30 - August 3, 2007, Vancouver, Canada

- **Seminar TATCOT 25 years Prosthetic and orthotic services including rehabilitation related to diabetes and other neuropathic disabilities, November 12-15, 2007, Moshi, Tanzania**

- **Physical examination of the diabetic foot, Treatment, rehabilitation perspective (general). Closing discussion of the day, November 13, 2007 Moshi, Tanzania.**

- **Facilitating the Rehabilitation of people with physical disabilities in developing countries.** Leahy War Victims Fund. Ronald Reagan Building, December 11, 2007, Washington DC, USA

- **Moving beyond your profession.** Don Bosco University, San Salvador, El Salvador, April 8, 2008

- **The neuropathic foot; therapeutical options.** Don Bosco University, San Salvador, El Salvador, April 8, 2008

- **Lower extremity amputations: an update in management and new prosthetics.** 16th European Congress of Physical and Rehabilitation Medicine, Bruges, Belgium, June 5, 2008


- **Treatment, rehabilitation, perspective (general) of the diabetic foot.** Jornadas de Manejo del Pie Diabético y del Amputado, IREP Instituto de Rehabilitación Psicofisica. Buenos Aires, Argentina, October 31, 2008

**Prof K Postema**

- **Role of corrections in daily practice: a simple and adequate solution in different foot problems.** 3rd Congress of the Asian Rehabilitation Medicine Association (ARMA), Updating Physical Medicine and Rehabilitation towards 2010, Bali, Indonesia, Sept. 8-11, 2004

- **Dynamic balance with a prosthesis.** 3rd Congress of the Asian Rehabilitation Medicine Association (ARMA), Updating Physical Medicine and Rehabilitation towards 2010, Bali, Indonesia, Sept. 8-11, 2004
• Foot problems and shoe solutions; adaptations on footwear with special attention for the roll of mechanism. 3rd Congress of the Asian Rehabilitation Medicine Association (ARMA), Updating Physical Medicine and Rehabilitation towards 2010, Bali, Indonesia, Sept. 8-11, 2004
• Latest developments in musculoskeletal rehabilitation. 4th Congress of the Asian Rehabilitation Medicine Association (ARMA), 31 August 2007, Manado, Indonesia
• Varus and valgus deformities in children. 4th Congress of the Asian Rehabilitation Medicine Association (ARMA), August 31, 2007, Manado, Indonesia

Prof PU Dijkstra
• Systematic review of literature. Symposium Clinical Research in Oral and Maxillofacial Prosthetics, February 4-5, 2005, University Medical Center Groningen
• Multi-center clinical research pitfalls and possibilities. Symposium Clinical Research in Oral and Maxillofacial Prosthetics, February 4-5, 2005, University Medical Center Groningen

MF Reneman
• IWS FCE: Reliability research. Isernhagen Work systems 2004 International provider Conference, September 2004, Duluth, Minnesota, USA
• Testing lift capacity: validity of determining effort level by means of observation. Isernhagen Work systems 2004 International provider Conference, September 2004, Duluth, Minnesota, USA
• Functional outcomes. The changing face of pain management programs; official satellite symposium of the 12th World Congress on Pain, August 14-15, 2008, Liverpool, UK
• Determinants of performance. Workshop Performance of performance measures, World Congress on Pain, August 18-22, 2008, Glasgow

CK van der Sluis
• Clinical examination of the hand, 18 April 2006 (Surabaya)
• Clinical examination of the hand, 25 April 2006 (Jakarta)
• Phases in wound healing and rehabilitation of complex hand injuries, 19 April 2006 (Surabaya)
• Phases in wound healing and rehabilitation of complex hand injuries, 26 April 2006 (Jakarta)
• Biomechanical principles of ulnar drift, 20 April 2006 (Surabaya)
• Biomechanical principles of ulnar drift, 27 April 2006 (Jakarta)
• Biomechanical principles of the rheumatic thumb, 20 April 2006 (Surabaya)
• Biomechanical principles of the rheumatic thumb, 27 April 2006 (Jakarta)
• Development of a protocol to train patients how to use an upper limb prosthesis. Bloorview Kids
• Rehab Center, Toronto, Canada, 6-11-2007
• Development of a protocol to train patients how to use an upper limb prosthesis. Otto Bock, Oakville, Canada, 8-11-2007
• Prosthesis simulators, a research proposal. Otto Bock, Wenen, Oostenrijk, 22 April 2008
Conference organizational activities
The Department of Rehabilitation Medicine organized the following courses / congresses:

- Amputation and Prosthetics of the Lower Extremity (three days) (2003)
- The Orthopedic Shoe (one day) (2003)
- Five-day course Physical Examination and Scientific Research (2003)
- Five-day course Physical Examination and Scientific Research (2004)
- Are there Borders of Physical Therapy (one day) (2005)
- Five-day course Physical Examination and Scientific Research (2005)
- Amputation and Prosthetics of the Lower Extremity (three days) (2006)
- The Orthopaedic Shoe (one day) (2006)
- Five-day course Physical Examination and Scientific Research (2006)
- Burn Wounds and Other Accidents from a Rehabilitation Perspective (two days) (2007)
- Five-day course Physical Examination and Scientific Research (2007)
- 19th Annual Meeting of the European Academy of Childhood Disability (EACD): Development Differentiation in Childhood Disability, June (three days) (2007)
- Five-day course Physical Examination and Scientific Research (2008)

Editorships
Prof JHB Geertzen
- Member of the Editorial Board of Clinical Rehabilitation

Prof K Postema
- Member of the Editorial Board of Prosthetics and Orthotics International

Prof PU Dijkstra
- Member of the Editorial Board of the Yearbook Physical Therapy

MF Reneman
- Member of the Editorial Board of Occupational Rehabilitation

Membership of academies and committees
Prof JHB Geertzen
- President of the Dutch Society for Physical and Rehabilitation Medicine
- President-elect of the International Society for Prosthetics and Orthotics
- Dutch Society for Physical and Rehabilitation Medicine
- International Society for Prosthetics and Orthotics
- International Association for the Study of Pain
- Dutch Association for the Study of Pain
- International Society of Physical and Rehabilitation Medicine
- European Society of Physical and Rehabilitation Medicine

Prof K Postema
- Dutch Society for Physical and Rehabilitation Medicine
- International Society for Prosthetics and Orthotics
- International Society of Physical and Rehabilitation Medicine
- European Society of Movement, Analysis for Adults and Children
Prof PU Dijkstra
- Royal Dutch Society for Physical Therapy
- Dutch Society for Orofacial Therapists
- Dutch Society for Gnathology and Prosthetic Dentistry
- Dutch Society for Oral and Maxillofacial Surgery
- Dutch Society for Epidemiology
- Dutch Society for Physical and Rehabilitation Medicine

MF Reneman
- International Association for the Study of Pain
- International Association for the Study of Pain Special Interest Group Pain and Movement
- Dutch Society for Movement Sciences

JPK Halbertsma
- Dutch Society for Human Movement Societies

CK van der Sluis
- Dutch Society for Physical and Rehabilitation Medicine
- Scientific Committee of the Dutch Society for Physical and Rehabilitation Medicine
- Dutch Society of Traumatology
- International Society for Prosthetics and Orthotics
- Dutch Society for Hand Surgery
- Dutch Society for Hand Therapists
8 Societal relevance

This section covers the social, economic and cultural relevance of our research. In many of the research questions, patient societies are involved; before starting research in, for example, chronic pain, patients in a patient pain society will be asked whether they will read or add to our comments or make recommendations to the research proposal, or they are asked to be on an advisory board. Other stakeholders, the orthopedic industry or policymakers, for example, are also involved.

Another example: at the moment, we are working on a theme entitled ‘handicap and sports’. In pursuing this theme, we are working together with the department of Sports Medicine, the department of Human Movement Sciences and the department of Orthopedic Surgery of our hospital. We also collaborate with the Dutch Olympic Committee and the Dutch Society for Physically Disabled Athletes.

Topics in the theme ‘handicap and sports’ range from ‘from special heroes to paralympic athletes’; ‘elderly and sports’; to ‘the young disabled athlete’. In these themes we are working in cooperation with the Dutch Olympic Committee in order to select those young potential athletes who will become paralympic athletes. We are researching the possibilities, but also the problems encountered by young disabled athletes.

The societal impact of the research and the research outcomes of the RPR program are difficult to measure. The outcome of our research in the chronic pain group, for example, has been implemented in the Consensus report Pain Rehabilitation Netherlands, a report for all rehabilitation centers regarding chronic pain patients. As a result, the direct outcome of our research is implemented by all rehabilitation centers in the Netherlands; the pain questionnaires used in our rehabilitation center have become a standard in many other rehabilitation centers. In addition, the findings of the research done in the field of complex regional pain syndrome have been adopted by many other medical and paramedical specialties (the evidence-based guidelines for multidisciplinary treatment and diagnosis for complex regional pain syndromes). All the research done in the past few years regarding amputation and prosthetics will be adopted into a process that began on January 1, 2009, using evidence-based and multidisciplinary treatment of amputee patients of the lower extremity. The research (theory-driven) conducted by some researchers within our department has raised many questions concerning the daily treatment of amputee patients. Van Twillert’s paper with this focus has been accepted and is published in 2009 in Clinical Rehabilitation. This paper raises many questions regarding our daily empirical treatment of amputee patients without using any evidence. Finally a few scientific reports (Lettinga) have been written by several researchers in our program under the title: ‘Theory driven program innovation in chronic low back pain rehabilitation’ (three reports for different rehabilitation centers in the Netherlands).

Most of the research in our department / program can be categorized as falling within the main theme of our hospital: ‘healthy aging’. In the case of rehabilitation, it can be modified to ‘healthy aging for people with a disability’.
9 Vitality and feasibility

Evaluation of the previous committee’s recommendations
The RPR program has substantiated and extended its research by producing more publications than in the last evaluation period. We strive to publish in journals with a top-30% position in their fields. As mentioned before, we combined 3 spearheads into 2, to enable more scientific, in-depth, exchange, stimulation, and enrichment to more (young) scientists.

The Peer Review Committee advised that the methodological approach would benefit from generic epidemiological support. In this evaluation period we attracted two young scientists who have additional and more statistical and epidemiological knowledge.

Vitality and feasibility
The viability of the RPR program’s research is very good. With the start of the new head of the department of Rehabilitation Medicine, prof Geertzen, new contacts have been established. Since we have access to outpatients as well as inpatients in conducting our research (at the only Dutch University Rehabilitation Center), we are also free to develop our own research plans. We are still seeking opportunities to find more partners in research as described below.

Together with Hanze University Groningen, we now have a few PhD scholarship students. All the topics of the PhD scholarship students fall within our spearheads. As of June 1, 2009, we appointed a new professor in Rehabilitation Medicine with the focus on rehabilitation research: prof PU Dijkstra. One of his tasks will be to continue and to intensify the relationship with the Hanze University Groningen. At the same time we are working with the Hanze University Groningen to have a lector appointed as a new professor in Rehabilitation Medicine with a focus on paramedical care and research. Furthermore, the Hanze University has only recently set up a Master’s training program in physical therapy. In the future, it will be possible to have more exchange students at the Master’s level to conduct research at both institutions.

As mentioned earlier, we are trying to collaborate with our societal partners, the Dutch Olympic Committee, the Dutch Society for Physically Disabled Athletes, and also with many other departments in our hospital, in order to work on the theme ‘sports and disability.’ This will also be implemented in collaboration with the Board of the University Medical Center Groningen under the umbrella ‘healthy aging.’

Ever since January 1, 2009, there has been a lot of discussion between the department of Rehabilitation Medicine (and the Center for Rehabilitation) and nursing homes and educators for specialists in nursing home medicine and elderly medicine. The aim of this dialogue is to develop an on-going relationship that will further our understanding, as well as to implement research in this field. Again, this will be established under the umbrella of ‘healthy aging.’ One of our PhD scholarship students will be focusing on the elderly amputee. One of the educators in elderly medicine has agreed to participate in this PhD project.
**SWOT analysis**

**Strengths**

*Internal*
- Very good support for research (epidemiological and theoretical knowledge)
- Gaitlab available
- Strong cooperation with other (medical) departments in the University of Groningen and the UMCG
- Both outpatients and inpatients are available for research

*External*
- Good national and international network. There is cooperation with the University of Wuppertal, the Katholieke Universiteit Leuven, the University of Münster, Radboud University Nijmegen Medical Center, the University of Twente, etcetera

**Weakness / Threats**

*Internal*
- The policy plans of research, patient care and education are not integrated enough as yet; we are working on this. In the autumn of 2009 we will develop a strategic plan regarding research in the future. Plans regarding translational research depend on just a handful of people. This makes it quite vulnerable

*External*
- Rehabilitation is not ‘sexy’ and therefore it is very hard to get external funding (large grants)
10 **Next generation**

With the start of the new leadership we will establish a more solid base of the leading scientific staff with the full support of the Executive Board of the University Medical Center Groningen. In 2009 a new professor (PU Dijkstra) was appointed. We expect to have three new professors appointed in the course of 2010, which will give us more scientific profile in the UMCG but also nationally and internationally. In the same time these appointments will give us a good PR and make our research program even more attractive for young scientists to come to Groningen.

The number of international PhD students in our department has increased significantly from one in the previous evaluation period to four at present. In December this year we will appoint another three.

In our resident training program in Rehabilitation Medicine, all residents have to prepare at least one article ready for submission for publication at the end of their four-year course. We, in Groningen, are the only program in the Netherlands to have this requirement, and with success. This is how we try to stimulate young rehabilitation physicians to continue performing research after their graduation.
Refereed articles in ISI journals

2003


Geertzen JH, Craig J. ISPO policy with regard to consumers as users of prostheses and orthoses. Prosthetics and Orthotics International 2003; 27:2-3.


** top-10% article  *  top-30% article


Rietman JS, Geertzen JHB, de Vries J. Short-term morbidity of the upper limb after sentinel lymph node biopsy or axillary lymph node dissection for Stage I or II breast carcinoma - Reply. *Cancer* 2004; 100:655-656.


2005


** top-10% article  * top-30% article


** top-10% article  *  top-30% article

**2007**


** top-10% article  * top-30% article


2008


van Scheppingen C, Lettinga AT, Duipmans JC, Maathuis KG, Jonekman MF. The main problems of parents of a child with epidermolysis bullosa. Qualitative Health Research 2008; 18:545-556.


- Refereed articles in non-ISI journals

2003


2004


2005


2006


2007


2008


Book chapters

2003


2004


2005


2006


2007


2008


Books

2003


2006


Geertzen JHB, Perez RSGM, Dijkstra PU, Kemler MA, Rosenbrand CJGM, (eds.). Richtlijn Complex Regionaal Pijn Syndroom (Evidence-Based Guidelines for Multidisciplinary Treatment and Diagnosis of Complex Regional Pain Syndrome Type I). Alphen a/d Rijn, Van Zuiden Communications BV, 2006.

2007


2008


PhD theses (co)supervised

2003


- Sturms LM. Pediatric traffic injuries; consequences for the child and the parents. Supervisors: prof WH Eisma, prof HJ ten Duis, prof JW Groothoff Co-supervisor: dr CK van der Sluis

- SHARE thesis (All theses: University Medical Center Groningen, University of Groningen, unless otherwise stated)
2004

- Brouwer S. Disability in chronic low back pain; psychometric properties of ADL- and work-related instruments. Supervisors: prof JHB Geertzen, prof JW Groothoff, prof LNH Göeken Co-supervisors: dr PU Dijkstra

- Dekker R. Long-term outcome of sports injuries. Supervisors: prof HJ ten Duis, profs WH Eisma, prof JW Groothoff

- Huitema RB. Functional recovery of gait after stroke. Supervisors: prof K Postema, prof WH Brouwer, prof Th Mulder Co-supervisor: dr AL Hof


- ter Schegget-Slaterus MJ. The quality of expert advice in relation to the act on facilities for the handicapped. Supervisors: prof JW Groothoff, prof WH Eisma

2005


- Rietman JS. Treatment related morbidity in breast cancer patients; a comparative study between sentinel lymph node biopsy and axillary lymph node dissection. Supervisors: prof WH Eisma, prof HJ Hoekstra, prof JHB Geertzen, prof JW Groothoff Co-supervisor: dr PU Dijkstra

- van de Leur JP. Clearance of bronchial secretions after major surgery. Supervisors: prof JH Zwaveling, prof JHB Geertzen Co-supervisor: dr CP van der Schans

2006

- Kuijer W. Measuring disability in patients with chronic low back pain; the usefulness of different instruments. Supervisors: prof JHB Geertzen, prof JW Groothoff Co-supervisor: dr PU Dijkstra

- Stienstra Y. Mycobacterium ulcerans disease in West Africa. Supervisor: prof TS van der Werf Co-supervisors: dr PU Dijkstra, dr WTA van der Graaf

2007

- Nijhuis BGJ. Team collaboration in Dutch paediatric rehabilitation - cooperation between parents, rehabilitation professionals and special education professionals in the care for children with cerebral palsy. Supervisors: prof K Postema, prof H Nakken, prof JW Groothoff Co-supervisors: dr HA Reinders-Messelinck, dr ACE de Blécourt

- van Weert E. Cancer rehabilitation - effects and mechanisms. Supervisors: prof K Postema, prof R Sanderman Co-supervisors: dr C van der Schans, dr JEHM Hoekstra-Weebers, dr R Otter

SHARE thesis (All theses: University Medical Center Groningen, University of Groningen, unless otherwise stated)