

# C-Mill VR for patients with MS and amputees

## Clinical integration of Rehabilitation and MS Center, Overpelt, Belgium



### -Ilse Bosmans, physiotherapist -

Rehabilitation and MS center is an inpatient and outpatient clinic, specialized in patients with Multiple Sclerosis (MS) but also patients with other disorders of the nervous system and musculoskeletal system who need intensive neurological and/or locomotor rehabilitation. In addition, the center is acknowledged as an expertise center for coma patients.

The C-Mill is a great added value in the rehabilitation of our patients. It is a fun way of working both for patients and therapists.

Here we describe our clinical setting and hope that it serves as an example to support other clinics that also work with the C-Mill.

### Patient Group

Our main pathologies are patients with MS, stroke, Parkinson, Guillain-Barré, total hip and knee replacements, amputations, spinal cord injuries and poly traumatic patients. In addition, we offer a stimulation program for coma patients.

We have approximately 120 hospitalized patients and 150 ambulatory patients, which corresponds to an average of 15 to 16 patients per therapist per day.

The C-mill is located in the therapy room in a **nicely separated room** with a very large window. As a result all patients have the opportunity to view what is being practiced on the C-Mill. The area can be closed as well, sometimes needed to increase the patient's concentration, the light can be dimmed without disturbing other rehabilitation patients and in this room there is no passage which makes this area a bit quieter.

The C-Mill is used for **gait and balance training**. We use different forms of training based on the pathological condition of the patient.



Therapist Jasper Grevendonck with a patient

In general, we notice that the weight shifting and balance training applications are most commonly used. **Gait analysis** is mainly used in the better patients to provide feedback on their walk ability.

We also have an **Erigo** to verticalize patients at an early stage of their rehabilitation, which gives a reduced chance of orthostatic hypotension while the legs are actively mobilized and practiced with stepping experience.

### Prescription: inclusion criteria

We do not use any indication criteria. Our therapists estimate the possibilities of the patient and depending on the treatment objectives the C-mill is being scheduled or not.

### Duration and frequency of sessions

The C-Mill is used very often during the day. The number of patients often varies between **15 and 20 patients per day**. The C-Mill training duration is between **15 and 30 minutes**.

### Patient evaluation

We use the **weight distribution assessment** and the **gait analysis** for our patients. We also use the training applications to evaluate the patients walking ability. For example, Stepping stones can be adjusted in step length, step width during walking to normalize the gait of patients with a leg prosthesis or MS. Another possibility is to use a cognitive test in combination with stepping or balance exercises on the C-Mill.

In addition, obstacles, accelerations can be used to evaluate the patients ability as well. This form of evaluation in an observational manner is also important for us.



Therapist Dennis Hannes with a patient

The gait analysis outcome that we use is e.g. unipedal stance duration, step length and the butterfly. We also like to provide a patient with **visual feedback** via the video module while walking. The weight distribution outcome is used for amputee patient to show the amount of weight shifting towards the affected leg.

We use the results to **set treatment goals**, also for therapy that not take place on the C-Mill. Later we can **re-assess** the patient on the C-Mill to see if the patient improved his gait pattern.

Progression measurements are used very frequently, since it is **easy to monitor** the patient by comparing different results. Most parameters can be selected and set against each other, which is an absolute added value of the C-Mill.

### What are the main reasons to include Motek technology as part of the therapy?

The C-mill certainly provides added value in various aspects of our rehabilitation. First of all, the C-Mill starts at a slower speed than a traditional treadmill.

The C-Mill is **embedded in the ground** in our center, which provides **greater accessibility** for the patients, as well as access for the **wheelchair**.

The C-Mill is a very pleasant interactive way of achieving **goal oriented therapy** for patients. In addition, we are able to improve the patient's walking subconsciously by adjusting certain training options or by being able to respond directly to the patient's weaknesses. You can easily compare results of the assessments, but also the results of training.

We notice very good results in **subconsciously adjusting the gait pattern**, for example, by letting

the patients stepping on the stones. Patients concentrate on the stepping stones and are not aware of the changed gait pattern.

Finally, the body weight system is an added value to practice safely with low-capacity patients.

Patients are certainly aware of the added value of the C-Mill as well. If you discuss the results of the assessments with the patients, you can use the graphs to explain more easily what is correct and what can be improved. It is easier to **show their progress with graphs** and it encourages patients to do the next assessments even better. The **size of the treadmill** is also a big plus, patients feel **more safe** and comfortable here than on a traditional, small treadmill.

### Other additional therapies provided

- Wii and Kinect: higher rehabilitation level for patients.
- Balance trainer & balance master: balance training with or without support and visual feedback.
- Myro and ReJoyce: training of the upper extremities.
- Hydrotherapy for in- and outpatients
- Cardiopulmonary performance test

### Organization: responsible team

We are with 26 physiotherapists and 12 occupational therapists in our center. About 80 to 90% of the therapists make use of the C-Mill. A few therapists serve as **the main contact point** in case of any questions from other therapists and they regularly



All physiotherapists of the rehabilitation and MS Center in Overpelt

provide **internal education training**.

We mainly work with specialized therapists in neurological rehabilitation, musculoskeletal or locomotor rehabilitation. Furthermore, all therapists are encouraged to continue their education through external and internal training. Our center works together with an Orthopedic surgeon to ensure efficient treatment of the patient after an amputation

and learn to walk again with a prosthesis. We do not make use of central therapy scheduling for the C-Mill.

### Billing and Financial Compensation of Therapy

We used the C-Mill gait analysis already several times to **request reimbursement** for patients by providing the most comprehensive assessment as possible to the insurance company.

## Summary

<b>Patient group</b>	Mainly patients with balance and gait problems due to MS, stroke, amputation or parkinson.
<b>Inclusion criteria</b>	<ul style="list-style-type: none"> <li>• Therapists estimate the possibilities of the patient</li> <li>• Depending on the treatment objectives</li> </ul>
<b>Duration and frequency</b>	<ul style="list-style-type: none"> <li>• Session duration: between 15 and 30 minutes</li> </ul>
<b>Patient evaluation</b>	<p><b>weight distribution assessment</b></p> <ul style="list-style-type: none"> <li>• <b>For amputees:</b> % weight shifting affected leg</li> </ul> <p><b>Gait analysis</b></p> <ul style="list-style-type: none"> <li>• <b>MS and other neurological patients:</b> Butterfly (gaitogram), video feedback, % step length, % unipedal stance duration.</li> </ul> <p><b>Observational evaluation with training applications</b></p> <ul style="list-style-type: none"> <li>• Stepping stones, obstacles, accelerations or in combination with a cognitive test.</li> </ul>
<b>Organization: Responsible therapy Team</b>	A total of 26 physiotherapists and 12 occupational therapists. 80-90% of the therapists make use of the C-Mill. A few therapists are contact point and provide internal education of the C-Mill.
<b>Billing and Financial Compensation of Therapy</b>	The C-Mill gait analysis is used to request reimbursement for patients