

# Early mobilisation with a bed bicycle

An internationally recognised guideline understands early mobilisation as "(...) the beginning of mobilisation within 72 hours of admission to the intensive care unit" [1]. However, other studies conclude that early mobilisation has not been clearly defined in the literature [3, 11]. Nevertheless, early mobilisation after an acute event often poses a challenge to healthcare professionals. This not only applies to acute care, but is also reflected in rehabilitation, where the mobilisation of severely affected patients is also of fundamental importance. Mobilisation with a bed bicycle is a good way of easing the strain on staff and still implementing the requirements of early mobilisation. Several studies confirm that mobilisation with a bed bicycle is safe and practicable [8, 9]. Positive effects at discharge include

improved restoration of functional training capacity and improved muscle strength. The functional status of the patient is thus improved, which has a positive effect on their further recovery [2]. The requirements and backgrounds of early mobilisation differ in the two core areas of acute medicine and rehabilitation.

## Early mobilisation in the acute care clinic

The risks of intensive care patients remaining immobile are clear. Affected patients show general "deconditioning" consisting of general weakness, rapid fatigue, increasing atrophy of the respiratory and skeletal muscles, psycho-cognitive deficits, reduced haemodynamic responsiveness as well as position-related skin and soft tissue damage [1]. It is therefore of fundamental importance to provide intensive care patients with early mobilisation from day one. Early rehabilitation can be beneficial not only for the patient in the long term, but also for the health system: by shortening the length of the patient's stay, early rehabilitation helps to keep down treatment costs [1, 6, 7].

The main objectives are to increase or maintain skeletal and respiratory muscle function and to increase haemodynamic responsiveness. This prevents general deconditioning. As well as positively influencing the length of time spent on artificial ventilation, early mobilisation also helps to increase the Barthel index, the probability of being discharged home and the functional independence measure (SF-36).

Based on these results, early rehabilitation is important for all intensive care patients for whom there are no exclusion criteria for mobilisation. The German guideline therefore recommends that intensive care patients be mobilised within 72 hours of admission at the latest. This should be done twice daily for at least 20 minutes [1]. There are two parameters that are fundamental to early rehabilitation: staff and equipment. Successful early mobilisation is therefore always based on concepts tailored to the specific needs of the clinic, which promote interaction between patient, clinic and equipment [7].

### Rehabilitation of severely affected patients

In the rehabilitation of severely affected patients, in contrast to acute care, the focus is not on stabilising important life parameters but on promoting activity. Rehabilitation is an active learning process aimed at coping with disability, minimising impairments / activity limitations or fully restoring them [4]. According to ICF, rehabilitation is about maintaining or improving body functions, body structures, activity and participation.

Patients themselves often express goals at the everyday level, such as regaining walking ability, physiological food intake or maintaining social activities. It is therefore the task of the treatment team to formulate intermediate goals and derive a treatment strategy from them [10].

The motion cycles during walking and cycling are very comparable. In both activities the same muscles are addressed in the same coordination sequence, which is why cycling with a bed bicycle is a good additional therapy for the restoration of walking ability in severely affected patients. In addition, therapy with a bed bicycle can be seen as preparation for further rehabilitation.

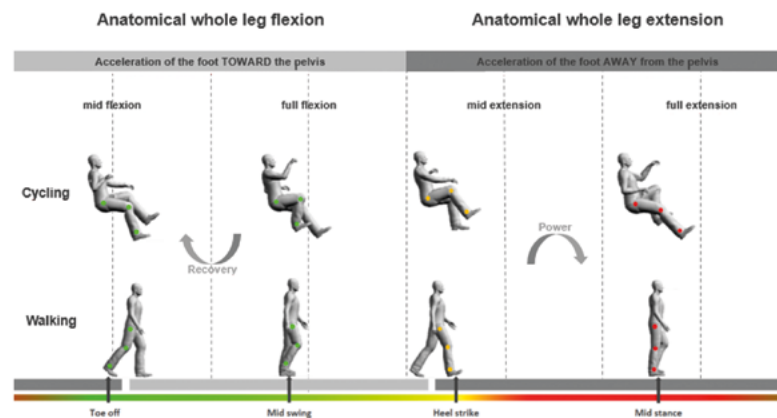


Figure 1: Comparison of gait cycles in walking and cycling

(Source: own illustration according to Zehr EP et al. (2016))

At the functional level, a bed bicycle also improves muscle strength, mobility and endurance and further stabilises the cardiovascular system. Respiratory function is improved and intestinal function is activated. This not only has positive effects on the metabolism, but also shortens the length of stays.

In summary, as many studies confirm, patients benefit particularly from the use of bed bicycles. This applies to both acute care and rehabilitation. Bed bicycles have the great advantage that they accompany patients in their recovery process: passive as well as assistive and active training is possible with both the upper and lower extremities. Moreover, as many guidelines confirm, cycling in bed is a safe and practicable solution for both the patient and the treatment team [5, 7].

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