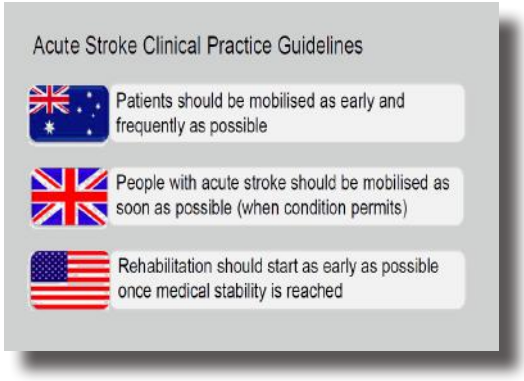
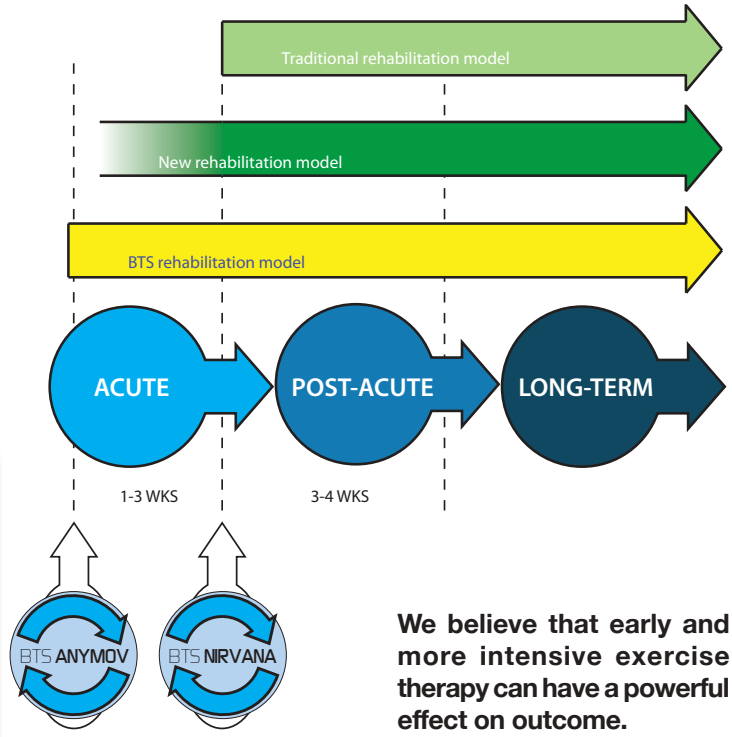
from a bed back to life... the most effective rehabilitation process

Stroke presents a major global public health challenge, with 5.5 million people dying from stroke each year (WHO 2003) and many more living with chronic disability (Wolfe 2000).

Early rehabilitation is described as an important feature of stroke unit care (Langhorne 1998), but patients are restricted to bed for some days (Diserens 2006) before mobilization is allowed.

Very early mobilization has been recently recommended in a number of acute stroke clinical guidelines (Adams 2003; NSF 2007).





We believe that early and more intensive exercise therapy can have a powerful effect on outcome.

But get the patient out of the bed immediately after the stroke event can be unsafe! With BTS ANYMOV the hospital bed becomes a robot for patient focused mobilization, performing the motor therapy directly in the hospital bed, as the first rehabilitation stage following a stroke or a traumatic brain injury event. Almost all the patients in post-stroke or post- traumatic brain injury condition show mobility deficits. Mobilization during the acute phase represents a key factor for a successful rehabilitation.

Through the easy EMG data acquisition system, therapists have the possibility to supervise patient's movements to evaluate efforts, or to observe if there is a muscular activity during the passive mobilization, providing in both cases indications about recovery potentials.

from a bed back to life... the most effective rehabilitation process

Over the last few years, the field of immersive reality (IR) has grown immensely.
One of the newest fields to benefit from the advances in this technology is that of medical rehabilitation. A virtual environment is a simulation of a real world environment that is generated through computer software and is experienced by the user through a human–machine interface. Whereas in the real world we gain knowledge about our environment directly through our senses—vision, hearing, touch, proprioception, smell—in the virtual world, we utilize these same senses to obtain information about the virtual world through a human–machine interface that can provide information specific to one or more senses, depending on the type of devices that have been selected for use. The information gathered about the virtual environment through the interface is then used to guide interactions of the participant within the virtual world.

With BTS NIRVANA, the motor exercise becomes an interaction tool with the enhanced virtual scene.

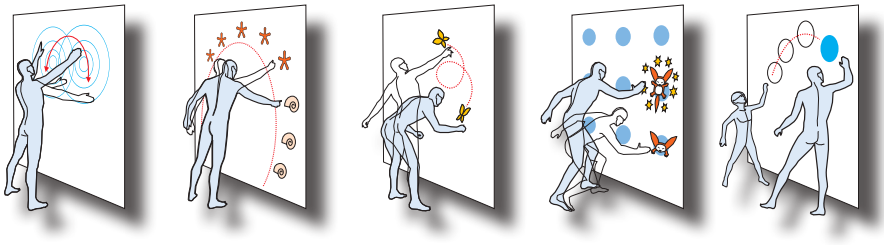
Each exercise provides a stimulating environment thanks to visual and audio feedback that together with the high quality graphics dramatically increase motivation in the subjects. BTS NIRVANA generates scenarios that can be projected over horizontal and vertical surfaces: thanks to the optoelectronic infrared system, the patient can interact with the virtual environment in the most natural way through his movements into the projection plane. The effectiveness of BTS NIRVANA relies in its motivational approach: its playful and target oriented nature, together with its sensorial feedback richness, proactively provide stimulus to the patient for better outcomes.

Rationale for using

VR as an adjunct for motor learning:
- Repetition: linked to success
- Feedback: can be augmented in VR
- Motivation: in order to tolerate high number of repetition necessary to achieve learning

Early findings

- Research consists mainly of small studies without large control groups, more about feasibility and pilot testing
- Some recurrent findings emerging
  1. Patients with disabilities appear capable of learning within VR environments
  2. Movements learned in VR environments appear to transfer to real world
  3. Learning appears increased in VR environments
  4. No occurrences of cybersickness in the available studies



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