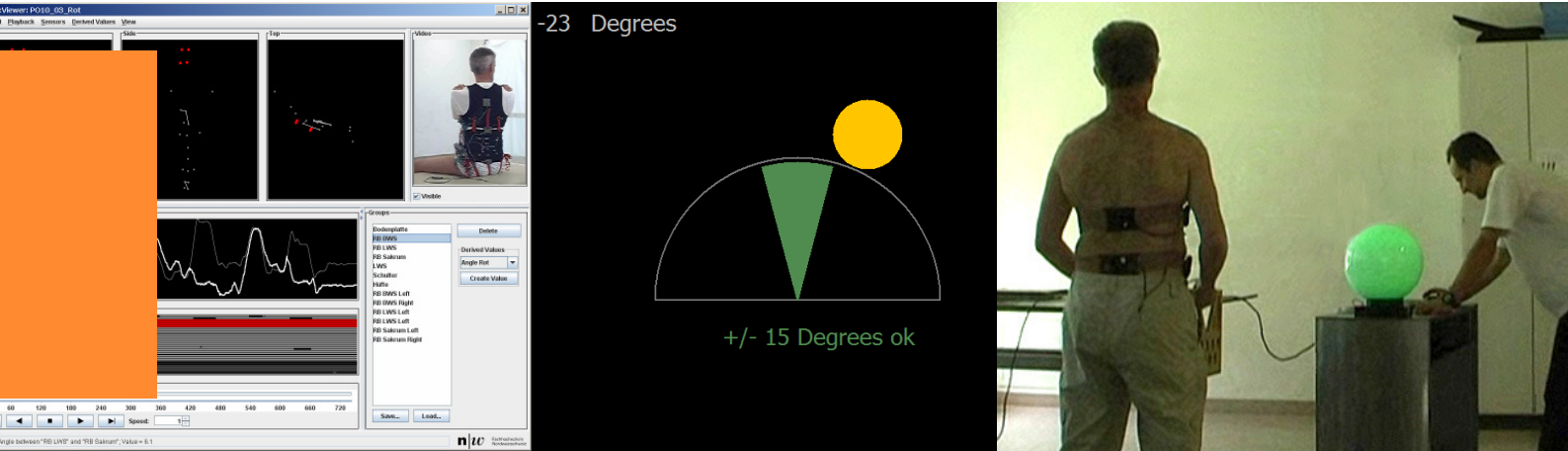


Backtrainer

Augmented feedback for the therapy of patients with non-specific low back pain



Introduction

Non-specific low back pain (LBP) is a frequent pain condition in industrialized countries with lifetime prevalence ranging between 48 and 72% leading to high costs (health care, work absenteeism).

Supervised exercise therapy has been proven to be effective in reducing pain and impairment. However, motor learning in LBP patients is often impaired because movement exercises are difficult to learn and patients often have reduced proprioception and motor control. Furthermore, poor compliance is a frequent reason for insufficient outcomes of exercise programs.

Aim of the present study

The aim of the Backtrainer project was to address the above mentioned limitations by developing a system that monitors the execution of movement exercises and provides a motivating, game-like visual feedback. Here, we present a first clinical evaluation of the Backtrainer.

Methods

Instrumentation: Two inertial motion capturing modules (MotionNode™) were attached to the patient's back at L5/S1 and Th12/L1 level.

Feedback: Posture of the lumbar spine (flex-/extension, lateral flexion or rotation) was displayed on a computer screen in different scenarios:

- Mobilizing exercise: move a target back and forth
- Stabilizing exercise: keep target in a predefined range while doing functional tasks
- Game exercise: catch rolling balls by moving a bat back and forth (Figure 2).

Subjects: 23 LBP stationary patients with LBP used the Backtrainer as part of their rehabilitation program.

12 physical therapists working with the Backtrainer.

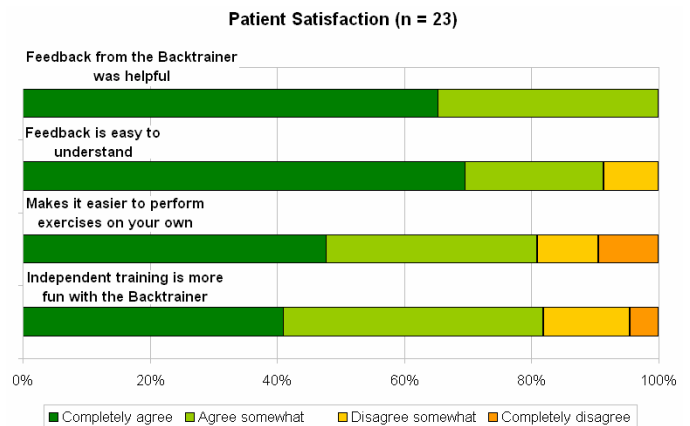
Measures: Questionnaires were developed to assess clinical feasibility, patients' and therapists' satisfaction.

Conclusion

We built a prototype of the Backtrainer that supports movement exercises for the management of low back pain with motivating, game-like feedback.

The Backtrainer prototype was successfully evaluated in a clinical usability study.

The overall user acceptance of the technology Backtrainer by patients and therapists is high. Most of the patients and therapists consider the Backtrainer to be a very useful system for the therapy of non-specific LBP.



We invite you to explore and develop new ideas together with us!

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