

assessing severity of spine problems and progress of treatments

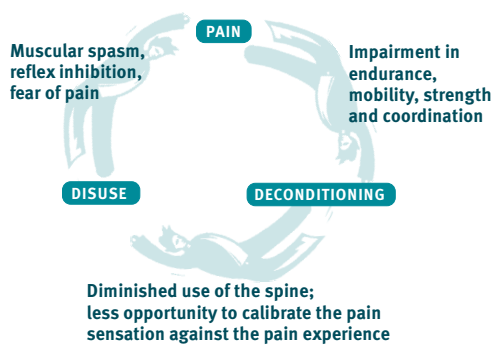


After specific serious causes for a patient's back or neck pain have been excluded, the challenge is to quantify the severity of problem and then select a treatment programme that is most suitable to the patient.



System Profile

The DBC Assessment system is designed as a response to the assessment challenge. Pain and subsequent muscular spasm, protective guarding and avoidance behaviour often expose chronic back and neck patients to functional deterioration leading to impairment and disability.



The system can be used in assessing the severity of deconditioning and in monitoring the progress and outcome of treatment given for back and neck patients. The system can be installed wherever there is a need to examine back and neck patients - including doctor's offices, physiotherapy centres, occupational health care units, rehabilitation centres, and hospitals.

The DBC Assessment system is recommended to be an integral part of total treatment plan. When combined with other DBC systems for active care, the assessment tools are suitable for:

- Screening
- Baseline measurement
- Progress and outcome measurement
- Follow-up monitoring

Questionnaires

The questionnaires are completely charting the patient's clinical history and present status of the spine, functional status, psychosocial status, general health and working conditions. Validated indexes and measurement tools contain:

● Pain Intensity VAS, Frequency and Pain Drawing

The pain intensity and the level of trouble are measured using a 100 mm Visual Analogue Scale. A pain drawing and frequency categories are used to differentiate the severity and obtain guidelines for treatment planning.

● Physical Impairment Index

The index is used for assessing the level of self-experienced physical impairment and disability.

● RBDS

Rimon's Brief Depression Scale is used to screen for depressive symptoms.

● RLC

Recovery Locus of Control tests the patient's attitude towards treatment.

● FABQ

Fear Avoidance Behaviour Questionnaire assesses the patient's beliefs on how physical activity and work affect their pain.

● PA

Physical Activity is measured by obtaining a MET (metabolic equivalents) score.

Evaluation Protocol

Baseline Evaluation

The treatment begins with baseline evaluation containing standard and optional evaluations as described in the patient evaluation procedure.

Outcome Evaluation

An evaluation of spinal function, pain and impairment levels and overall treatment satisfaction is performed after the treatment in outcome evaluation.

Progress Check

Progress in physical function and pain reduction is monitored during the treatment.

Follow-up

Periodical follow-up evaluations can be performed after ongoing treatments or home programmes. The software produces reports for patients, doctors and employers based on valid outcome criteria. Spine function, pain and working ability may be monitored. Especially objective measurements are used as a tool to motivate the patient and to convince him/her about the maintenance of good results.



Muscle Monitor

The DBC Muscle Monitor (EMG) is a device intended for measuring muscle fatigue during exercise in a lumbar extension device. Muscle fatigue is defined as inability to maintain required muscular contraction against external resistance or repeated task. Lumbar paraspinal muscle fatigue results as abnormal trunk

movements and loss of precise movement control. This may lead to micro injury of spinal structures, and cause low back pain. Excessive fatigability of back extensor muscles is common among chronic patients and maybe a risk factor for future low back pain.

The Muscle Monitor is capable of determining the fatigue rate from two muscle areas with a special method based on analysing the measured muscle impulses. The changes in the frequency of electric impulses generated by muscle cells due to fatigue are recorded. The device performs the analysis automatically and the user can read the measured results directly from display after the test.

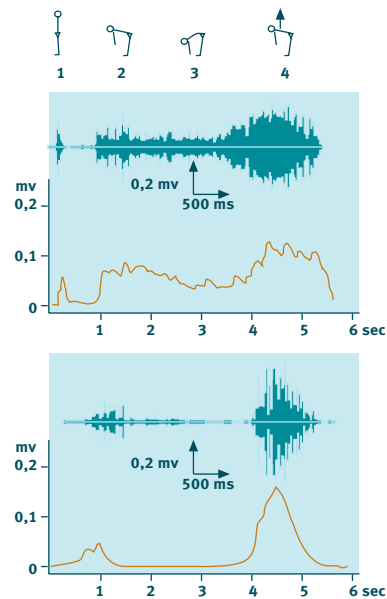
The device can also be used to detect missing flexion relaxation. Flexion relaxation is often missing in low back pain patients.

Balance Tester

Patients with spine problems often have impaired postural control. Especially chronic pain patients seem to suffer from an altered central nervous function, resulting as delays and poor co-ordination in muscle responses. These disturbances reflect to the postural control, and can be assessed with the DBC Balance Tester.



The inter-individual variability of traditional balance test outcomes is high and therefore not optimal for diagnostic purposes. However, the DBC Balance Tester results clearly differentiate between severe low back pain patients and healthy controls. The test is also reliable in monitoring the progress during and after the treatment.



Flexion relaxation is often missing in LBP patients (upper picture) compared to healthy individuals (lower picture).

1. Sihvonen T, Partanen J, Hanninen O, Soimakallio S. Electric behavior of low back muscles during lumbar pelvic rhythm in low back pain patients and healthy controls. Arch Phys Med Rehabil 1991;72(13):1080-7.
2. Kankaanpaa M, Taimela S, Webber CL, Jr, Airaksinen O, Hanninen O. Lumbar paraspinal muscle fatigability in repetitive isoinertial loading: EMG spectral indices, Borg scale and endurance time. Eur J Appl Physiol 1997;76(3):236-42.
3. Luoto S, Aalto H, Taimela S, Hurri H, Pyykkö I, Alaranta H. One-footed and externally disturbed two-footed postural control in chronic low-back pain patients and healthy controls: A controlled study with follow-up. Spine 1998;23:2081-2090.

Strength Tester

Reduced trunk muscle strength is one of the consequences of chronic low back pain. The DBC Strength Tester is a device intended for assessing trunk muscle strength as an additional option to the other assessment tools. On average back pain patients are weaker than healthy controls. Strength measurements may also be used in monitoring the progress of rehabilitation.



Software

The results from questionnaires and tests are analysed by using special computer software, which produces an estimate of the problem severity. The analysis facilitates the selection of a suitable treatment programme, supports the follow-up monitoring of the treatment's progress, and creates documentation of the outcome.



Quality Management

A quality management application is included in the DBC service concept. The Assessment system can be integrated with the DBC quality management application to monitor:

- Overview of patient flow
- Intervention type
- Monitored variables
- Treatment length
- Pain duration
- Diagnosis (pattern)
- Patients demographics
- Results: pain
- Results: response rate (pain)
- Results: impairment
- Results: mobility
- Results: absenteeism

Assessment System

Treatment Concept
Software Questionnaires Manuals
Medical Devices
Muscle Monitor Balance Tester Strenght Tester
Service Concept
Education Helpdesk Treatment Concept Updates Patient Data Analysis