Summary

This thesis addresses several issues related to low back pain. The disorder has been studied in patients in whom the complaints started during pregnancy, during delivery, or within three weeks after delivery (pregnancy-related low back pain, or peripartum pelvic pain, PPPP). Chapter 1 outlines the rationale behind this research on low back pain and why the study population comprised patients, whose complaints started during pregnancy or (almost immediately) after childbirth.

Chapter 2 presents an orientation study based on an inquiry among 394 members of the Dutch association for patients with PPPP. The study aimed to compile an inventory of the type and severity of disabilities in patients with PPPP, and to establish whether patients with PPPP have particular biopsychosocial characteristics.

The most important conclusions were:
1. PPPP seriously interferes with many activities of daily living.
2. The course of PPPP in patients whose complaints started during pregnancy do not differ from those whose complaints started during delivery or within three weeks after delivery.
3. The results support the hypothesis that PPPP is caused by strain of ligaments in the pelvis and lower spine due to a combination of damage to ligaments, hormonal effects, muscle weakness and the weight of the fetus.

Chapter 3 describes a randomized clinical trial in patients with PPPP to investigate the value of muscle exercises at 6 weeks to 6 months after childbirth. At the start of the study it was assumed that reinforcement of the diagonal trunk muscles in combination with strengthening of hip extensor muscles was the most promising therapeutic approach. It was concluded, however, that these exercises do not improve the course of the disorder. The results indicate that the potential benefit gained by enlarged muscle force is overruled by exacerbation of symptoms due to training of the hip extensor muscles.

Chapter 4 addresses the Active Straight Leg Raise (ASLR) test and its ability to assess PPPP and to measure disease severity. Reliability of the ASLR test was assessed in a group of 50 women with lumbopelvic pain of various etiology and various degrees of severity. Sensitivity was assessed in 200 patients with PPPP and specificity in 50 healthy women. The validity of the ASLR test as a severity scale was investigated by comparing the test score with the medical history, scores on self-reported scales on disability, pain and tiredness and pain provocation tests. Reliability, sensitivity and specificity of the

ASLR test proved to be high. Moreover, the ASLR score correlated as expected with all severity scales. The correlation between the scores on the ASLR test and the Québec Back Pain Disability Scale was very good.

Chapter 5 investigates whether the results of the ASLR test are related to mobility of the pelvic joints. The study was performed in patients with PPPP whose complaints were mainly localized at one side. Mobility of the pelvic joints was radiographically visualized by means of the Chamberlain method: i.e. two radiographs of the pubic symphysis were taken, one with the patient standing on the left leg on a small bench and the right leg hanging passively, and another when standing on the right leg with the left hanging passively. The motions of the ox coxae at the side with the (most) complaints were compared with those on the other side. In addition, radiographs were made during performance of the ASLR test. These latter radiographs proved to be identical to the radiographs made with the Chamberlain procedure. The radiograph made during the ASLR test at the right side was identical to that with the patient standing on the left leg (and vice versa). It was concluded that, when a subject in supine position raises the leg without bending the knee, the os coxae at that side is pulled to anterior rotation by the weight of the leg. The same occurs when the leg is hanging passively: when standing on one leg the os coxae at the standing side is not pushed backwards, as Chamberlain assumed, but the os coxae at the side where the leg passively hangs is pulled to forward rotation. Depending on the mobility of the pubic symphysis and the sacro-iliac joint, the force exerted by the weight of the leg results in a radiographically visible motion. Mobility at the (most) painful side was generally larger than at the other side. The influence of a pelvic belt on the ASLR test score was also investigated: the ASLR test score decreased when the patient was tested with the belt tightened round the pelvis. The conclusion drawn from these examinations is that a relationship exists between the ASLR test score and mobility of the pelvic joints.

Chapter 6 presents studies performed to establish whether hip abduction and adduction weakness are two phenomena in PPPP which may be used as diagnostic tools. Abduction and adduction strength was measured with a handheld dynamometer. Similar to the ASLR test study, the two phenomena were tested for reliability and validity. Sensitivity of abduction and adduction weakness was acceptable, but not high; this was mainly due to the large variation in muscle strength among healthy subjects. Moreover, the measured abduction strength was, to a slight extent, dependent on the physical strength of the examiner. Both tests proved very useful to measure disease severity in PPPP; the objective nature of the scores was a major advantage over self-assessment scales and physical examination.

Chapter 7 focusses on 48 tests which are judged for their ability to detect clinically relevant changes over time. The most ideal test is a simple, objective measure which provides a clear reaction to clinical change. The global impression of improvement scored by the patient was used as criterion standard. It appeared that the ASLR test, and the abduction and adduction strength of the hips allowed clinical changes to be

measured. This was also the case with the Québec Back Pain Disability Scale, pain in the evening, pain provoked by mediorotation of the hips, range of trunk flexion/extension, and strength of trunk extension. Other tests with relatively good test properties offered no additional value over these tests. It was noteworthy that mobility of the pelvic joints, measured with the Chamberlain method, showed virtually no change over an 8-week period of rehabilitation; both in patients with a large clinical improvement as well in those with substantial worsening. Thus, it seems that checking the clinical course by means of radiography has no value. Improvement of the clinical situation in the rehabilitation of patients with PPPP is clearly not achieved by decrease in mobility of the pelvic joints, but rather because patients learn to manage the disease in a better way; e.g. by improvement or adjustment of the use of their muscles in situations in which the pelvic joints are loaded.

Finally in Chapter 8 the results from this work are placed in a larger context and recommendations for future research are made.