

VU Research Portal

Rehabilitation after lumbar disc surgery

Oosterhuis, T.

2016

document version

Publisher's PDF, also known as Version of record

[Link to publication in VU Research Portal](#)

citation for published version (APA)

Oosterhuis, T. (2016). *Rehabilitation after lumbar disc surgery*. [PhD-Thesis - Research and graduation internal, Vrije Universiteit Amsterdam].

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

Take down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

E-mail address:

vuresearchportal.ub@vu.nl

1

General Introduction

General Introduction

Sciatica is characterised by sharp and radiating leg pain, which is usually unilateral and paraesthesias and muscle weakness may be present [1]. A relationship with lumbar spinal pathology was first suspected by the ancient Greek and Egyptians and Hippocrates was allegedly the first to use the term sciatica, from the Greek word for hip 'ischios'. He described the concurrence of sciatica, antalgic posture and claudication [2]. Herniated discs are a major cause of sciatica. Other causes include spondylolisthesis, foraminal stenosis, synovial cysts, piriformis syndrome, gluteal injection-site trauma, obstetrical sciatic compression and pelvic floor tumours [1]. In 1929 Dandy published the first report about the pathology and surgical treatment of herniated discs to decompress the nerve root [3]. More recent publications suggest that not so much the pressure on the nerve roots causes sciatica, but a combination of pressure-related, inflammatory and immunological processes [4].

The incidence of sciatica is estimated at 5 per 1,000 in Western countries [5]. In the Netherlands, the incidence of sciatica increased from 75,000 to 85,000 cases per year over the past decade [6, 7]. The direct and indirect costs of patients suffering from sciatica approximate 1.2 billion Euros per year [6]. Most cases of sciatica are self-limiting with pain decreasing over time [8]. The international consensus is that surgical treatment is offered if the radiating leg pain persists despite a period of conservative management [9]. In the Netherlands, a 6-8 week period of conservative treatment is recommended. Conservative treatment consists of explanation of the cause and expected course of the complaints, the advice to remain as physically active as possible with prescription of exercise therapy if needed and prescription of pain medication [10]. Rates of spinal surgery differ across and within countries [11]. Rates in the United States are 30% higher than in the Netherlands, 50-60% higher than in Canada and 80% higher than in the UK [5]. It is estimated that currently about 12,000 operations for herniated lumbar discs are performed in the Netherlands per year [12].

Recovery rates after conventional microdiscectomy of 66% at 4 weeks and 75% at 8 weeks follow-up have been reported [13] and return to work rates of 15% at 2 months follow-up [14]. As the group of patients with limited recovery highly contributes to the direct and indirect costs of lumbar disc surgery, an important aim of postoperative treatment is to return to activities of daily living as soon as possible and to prevent the development of chronic symptoms

[15]. Currently, postoperative care and management, including referral for rehabilitation after discharge, varies between hospitals and surgeons. A national survey in the UK showed that 55% of the surgeons did not send their patients for physiotherapy following spinal surgery [16]. Another UK survey revealed considerable variation in access to postoperative physiotherapy for outpatients and physiotherapists providing care to patients who had undergone lumbar disc surgery reported a wide variety of treatment contents being delivered [17]. A national survey in the Netherlands amongst spinal surgeons (both neurosurgeons and orthopaedic surgeons) showed that 65% of the surgeons always refer patients for postoperative physiotherapy after discharge, whereas 24% never refer patients for postoperative physiotherapy and 11% sometimes do. Likewise, 45% of the surgeons consider physiotherapy after discharge to be essential, but 30% of the surgeons strongly disagree that physiotherapy would be essential [18].

These differences in post-operative management were already shown in 1964 by Hansen, who published an overview of opinions regarding post-operative rehabilitation since 1945 [19]. Hansen described how opinions differed from expecting rehabilitation during the first post-operative weeks to be harmful, to stressing the importance of rehabilitation if patients were to return to work soon. Goals of rehabilitation were formulated as increasing joint mobility of the spine and increasing strength of the back extensors. More recently the rationale for rehabilitation changed to improving ADL functioning, return to work and a focus on more central mechanisms that may affect outcome. These central mechanisms are changes due to correction of a distorted body schema or altered cortical representation of the affected body parts, as well as modification of motor control patterns [20]. Other factors that may affect outcome include the therapist-patient relationship, changes in fear-avoidance beliefs, catastrophizing and self-efficacy regarding pain control [20]. These different ideas regarding rehabilitation led to a variety of treatment programs after lumbar disc surgery. Chapter 2 provides an overview of randomised trials that assessed the effectiveness of rehabilitation after lumbar disc surgery.

A similar debate about the necessity of exercise therapy has been going on with respect to acute low back pain. Acute low back pain is often self-limiting, and therefore exercise therapy is not deemed necessary. However, for a small proportion of patients symptoms do not decrease over time and become chronic. Several trials have been reported that assessed the effectiveness of exercise therapy for acute non-specific low back pain in people with symptoms

for up to 6 weeks with the objective to prevent these symptoms from becoming chronic. The results of these studies are summarised in a systematic review in chapter 3.

Earlier trials evaluating rehabilitation after lumbar disc surgery started 4-6 weeks after surgery, or the difference between the intervention and control groups started 4-6 weeks after surgery, after an initial equal exercise regimen. Effects of these interventions were only seen at short-term follow-up. An early rehabilitation program might accelerate recovery compared to interventions starting several weeks post-surgery. None of the earlier trials investigated both effectiveness and cost-effectiveness of early rehabilitation post-surgery compared to no referral for rehabilitation. As these two policies are the two common options after surgery in the Netherlands, we performed a randomised trial. Healthcare decision makers are increasingly being faced with decisions about what treatment to implement with the limited resources available, but data on the cost-effectiveness of postoperative management is scarce. Therefore an economic evaluation was conducted alongside the trial. In this pragmatic trial the intervention group started the rehabilitation program immediately after discharge from the hospital; the control group was not offered any treatment after discharge. The design of this trial and economic evaluation is described in chapter 4 and the results in terms of effectiveness and cost-effectiveness in chapters 5 and 6, respectively.

Adherence to exercises and advice, which are components of a rehabilitation program after lumbar disc surgery, is expected to influence the effectiveness of this rehabilitation program [21, 22]. Adherence to treatment can be defined as the extent to which a patient follows recommendations from the treating therapist [23]. Exercising happens to be the most common behaviour patients with pain fail to adhere to [24]. Also adherence to recommendations to increase levels of physical activity, as used in rehabilitation programs, is a known problem [25]. It is unclear which factors influence adherence to a rehabilitation program after lumbar disc surgery. A qualitative study was conducted to assess facilitators and barriers to treatment adherence and results of the interviews with participants of the intervention group of the trial are presented in chapter 7.

Finally, chapter 8 discusses the methodology, results and implications of the systematic reviews, randomised trial, economic evaluation and qualitative study.

References

- 1 Ropper AH, Zafonte RD. Sciatica. *N Engl J Med*. 2015 Mar 26;372(13):1240-8.
- 2 Truumees E. A history of lumbar disc herniation from Hippocrates to the 1990s. *Clin Orthop Relat Res*. 2015 Jun;473(6):1885-95.
- 3 Dandy WE. Loose cartilage from intervertebral disk simulating tumor of the spinal cord. *Arch Surg*. 1929;19(4):660-672.
- 4 Stafford MA, Peng P, Hill DA. Sciatica: a review of history, epidemiology, pathogenesis, and the role of epidural steroid injection in management. *Br J Anaesth* 2007;99(4):461-473.
- 5 Cherkin DC, Deyo RA, Loeser JD, Bush T, Waddell G. An international comparison of back surgery rates. *Spine* 1994, 19:1201-1206.
- 6 Health Council of the Netherlands. Management of Lumbosacral Radicular Syndrome (sciatica). The Hague: Health Council of the Netherlands; 1999.
- 7 van Beek E, Lemmens K, van Schooten G, Vlieger EJ. Reduceren van praktijkvariatie: budgettaire effecten van scherpere indicatiestelling. Breukelen: Plexus; 2010.
- 8 Vroomen PC, de Krom MC, Wilmlink JT, Kester AD, Knottnerus JA. Lack of effectiveness of bed rest for sciatica. *N Engl J Med* 1999, 340:418-423.
- 9 Andersson GB, Brown MD, Dvorak J, Herzog RJ, Kambin P, Malter A, McCulloch JA, Saal JA, Spratt KF, Weinstein JN. Consensus summary of the diagnosis and treatment of lumbar disc herniation. *Spine* 1996, 21(Suppl):75S-78S.
- 10 NHG-Standaard Lumbosacraal radiculair syndroom. www.nhg.org/standaarden/volledig/nhg-standaard-lumbosacraal-radiculair-syndroom
- 11 Weinstein JN, Lurie JD, Olson PR, Bronner KK, Fisher ES. United States' trends and regional variations in lumbar spine surgery: 1992-2003. *Spine (Phila Pa 1976)* 2006, 31(23):2707-2714
- 12 www.opendisdata.nl
- 13 Arts MP, Brand R, van den Akker ME, Koes BW, Bartels RH, Bartels RH, Leiden-The Hague Spine Intervention Prognostic Study Group (SIPS). Tubular discectomy vs conventional microdiscectomy for sciatica: a randomized controlled trial. *JAMA* 2009, 302(2):149-158.
- 14 Rasmussen S, Krum-Møller DS, Lauridsen LR, Jensen SE, Mandøe H, Gerlif C, Kehlet H. Epidural steroid following discectomy for herniated lumbar disc reduces neurological impairment and enhances recovery: a randomized study with two-year follow-up. *Spine (Phila Pa 1976)* 2008, 33(19):2028-2033.
- 15 den Boer JJ, Oostendorp RA, Evers AW, Beems T, Borm GF, Munneke M. The development of a screening instrument to select patients at risk of residual complaints after lumbar disc surgery. *Eur J Phys Rehabil Med* 2010, 46(4):497-503

- 16 McGregor AH, Dicken B, Jamrozik K. National audit of post-operative management in spinal 17 surgery. *BMC Musculoskelet Disord* 2006, 7:47.
- 17 Williamson E, White L, Rushton A. A survey of post-operative management for patients following first time lumbar discectomy. *Eur Spine J* 2007, 16(6):795–802.
- 18 Arts MP, Peul WC, Koes BW, Thomeer RT. Leiden-The Hague Spine Intervention Prognostic Study (SIPS) Group: Management of sciatica due to lumbar disc herniation in the Netherlands: a survey among spine surgeons. *J Neurosurg Spine* 2008, 9(1):32–39
- 19 Hansen JW. Postoperative management in lumbar disc protrusions. I. Indications, method and results. II. Follow-up on a trained and untrained group of patients *Acta Orthop Scand Suppl.* 1964:SUPPL 71:1-47
- 20 Steiger F, Wirth B, de Bruin ED, Mannion AF. Is a positive clinical outcome after exercise therapy for chronic nonspecific low back pain contingent upon a corresponding improvement in the targeted aspect(s) of performance? *European Spine Journal* 2012;21(4):575–98.
- 21 Hayden JA, van Tulder MW, Tomlinson G. Systematic review: strategies for using exercise therapy to improve outcomes in chronic low back pain. *Ann Intern Med.* 2005 May 3;142(9):776-85.
- 22 Vermeire E, Hearnshaw H, Van Royen P, Denekens J. Patient adherence to treatment: three decades of research. A comprehensive review. *J Clin Pharm Ther.* 2001Oct;26(5):331-42.
- 23 Sabaté E (ed). *Adherence to long-term therapies: evidence for action.* Geneva, Switzerland: World Health Organization; 2003
- 24 Turk DC, Rudy TE. Neglected topics in the treatment of chronic pain patients--relapse, noncompliance, and adherence enhancement. *Pain.* 1991 Jan;44(1):5-28.
- 25 Trost SG, Owen N, Bauman AE, Sallis JF, Brown W. Correlates of adults' participation in physical activity: review and update. *Med Sci Sports Exerc.* 2002 Dec;34(12):1996-2001.