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Clinical Study

# Recovery of motor deficit accompanying sciatica—subgroup analysis of a randomized controlled trial

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**Abstract**

**BACKGROUND CONTEXT:** In patients with sciatica due to a lumbar disc herniation, it is generally recommended to reserve surgical treatment for those who suffer from intolerable pain or those who demonstrate persistent symptoms after conservative management. Controversy exists about the necessity of early surgical intervention for those patients that have an additional motor deficit.

**PURPOSE:** The aim of this study was to compare the recovery of motor deficit among patients receiving early surgery to those receiving prolonged conservative treatment.

**STUDY DESIGN:** Subgroup analysis of a randomized controlled trial.

**PATIENT SAMPLE:** This subgroup analysis focuses on 150 (53%) of 283 patients with sciatica due to a lumbar disc herniation and whose symptoms at baseline (before randomization) were accompanied by a motor deficit.

**OUTCOME MEASURES:** Motor deficit was assessed through manual muscle testing and graded according to the Medical Research Council (MRC) scale.

**METHODS:** In total, 150 patients with 6 to 12 weeks of sciatica due to a lumbar disc herniation and whose symptoms were accompanied by a moderate (MRC Grade 4) or severe (MRC Grade 3) motor deficit were randomly allocated to early surgery or prolonged conservative treatment. Repeated standardized neurologic examinations were performed at baseline and at 8, 26, and 52 weeks after randomization. This study was supported by a grant from the Netherlands Organization for Health Research and Development (ZonMW) and the Hoelen Foundation The Hague.

FDA device/drug status: Not applicable.

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The disclosure key can be found on the Table of Contents and at www.TheSpineJournalOnline.com.

All authors listed above had full access to all the data (including statistical reports and tables) in the study and can take responsibility for the integrity of the data and the accuracy of the data analysis. GMO and WCP are guarantors of this article.

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*Written informed consent* was obtained from *all patients*. The medical ethics committees at the Leiden University Medical Center and the participating hospitals all approved the study protocol.

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**RESULTS:** Sciatica recovered among seven (10%) of the 70 patients assigned to early surgery before surgery could be performed, and of the 80 patients assigned to conservative treatment, 32 patients (40%) were treated surgically because of intolerable pain. Baseline severity of motor deficit was graded moderate in 84% of patients and severe in 16% of patients. Motor deficit recovered significantly faster among patients allocated to early surgery (p=.01), but the difference was no longer significant at 26 (p=.21) or 52 weeks (p=.92). At 1 year, complete recovery of motor deficit was found in 81% of patients allocated to early surgery and in 80% of patients allocated to prolonged conservative treatment. Perceived overall recovery of sciatica was directly related to the presence of an accompanying motor deficit. Severe motor deficit at baseline (odds ratio, 5.4; confidence interval, 1.7–17.4) and a lumbar disc herniation encompassing ≥25% of the cross-sectional area of the spinal canal (odds ratio, 6.4; confidence interval, 1.3–31.8) were the most important risk factors for persistent deficit at 1 year.

**CONCLUSIONS:** Early surgery resulted in a faster recovery of motor deficit accompanying sciatica compared with prolonged conservative treatment but the difference was no longer significant during the final follow-up examination at 1 year. 

*Keywords:* Lumbar; Herniated disc; Motor deficit; Paresis; Recovery

## Introduction

Typically, symptoms of sciatica consist of unilateral radicular leg pain. The most frequent cause of sciatica is lumbar disc herniation [1]. Among randomized controlled trials comparing the effectiveness of surgery to conservative treatment, surgery favored a better short-term recovery of sciatica compared with conservative management [2–7]. Four of these trials reported no significant or clinically relevant difference of long-term recovery of sciatica [2–5,7]. Therefore, it is generally recommended to reserve surgical treatment for cases with intolerable pain or persistent symptoms refractory to conservative management [8].

Controversy exists about the necessity of surgical intervention and timing of surgery for lumbar disc herniation accompanied by motor deficit. Radicular pain can be accompanied by motor deficits of varying severity. Motor deficits are found in 40% to 82% of cases of lumbar disc herniation [2–4,6,9–11]. A recent survey among spine surgeons demonstrated that the majority of surgeons preferred surgical treatment in the presence of motor deficit and were more likely to opt for surgery in case of severe or short-lived motor deficit [12]. Clear evidence for this approach is lacking. Recovery of motor deficit was reported in two randomized controlled trials [3,10], but neither of these trials demonstrated a significant difference between patients treated surgically and patients receiving conservative treatment. However, it must be noted that both trials have methodological shortcomings limiting their generalizability. In particular, Weber [10] does not elucidate how the presence or severity of motor deficit influenced the selection of patients for randomization, and Buttermann [3] reported no detail of the severity of motor deficit or involved muscles groups. Our study compares the recovery of motor deficit among patients randomly allocated to early surgery or prolonged conservative treatment and evaluates the clinical significance of motor deficit accompanying sciatica. Secondary aims are to identify factors associated with persistent motor deficit at final follow-up. For this purpose, a subgroup analysis of the Sciatica trial [2] was performed. Although this trial was originally designed to compare the efficacy of early surgery versus prolonged conservative treatment in patients with sciatica due to a lumber disc herniation, it also included patients whose symptoms were accompanied by moderate (Medical Research Council [MRC] Grade 4) and severe (MRC Grade 3) motor deficit. Because the subset of patients for this study is defined in terms of properties defined before randomization, this subset in itself has the structure of a randomized clinical trial.

## Methods

### *Study design*

The present study comprises a subgroup analysis of a multicenter, prospective, randomized trial among patients with 6 to 12 weeks of severe sciatica. Details of the design and study protocol have been published previously [13]. Originally, the outcomes of 141 patients allocated to early surgery and 142 patients allocated to prolonged conservative treatment were compared. This subgroup analysis focuses on 150 (53%) of 283 patients whose symptoms at baseline (before randomization) were accompanied by motor deficit.

### *Patient population*

Eligible patients consisted of patients 18 to 65 years presenting to the neurologist with sciatica due to a lumbar disc herniation persisting 6 to 12 weeks. Lumbar disc herniation was radiologically confirmed with magnetic resonance imaging (MRI) and symptom severity justified surgical treatment as evaluated by the neurosurgeon. Motor deficit was assessed through manual muscle testing and graded according to the MRC scale [14]. Patients were excluded in case of presenting with cauda equine syndrome or very severe