

Clinical Study

# The impact of generalized joint laxity on the occurrence and disease course of primary lumbar disc herniation

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## Abstract

**BACKGROUND CONTEXT:** Generalized joint laxity (GJL) has been associated with spine-related disorders such as low back pain, accelerated disc degeneration, and recurrence after discectomy surgery for primary lumbar disc herniation (p-LDH). Generalized joint laxity might be a causative factor of p-LDH, but this relationship is poorly understood. In addition, the impact of GJL on outcomes after the treatment for p-LDH has not been reported.

**PURPOSE:** To explore relationship between GJL and p-LDH and to compare clinical and radiological outcomes post-therapy in p-LDH patients with or without GJL.

**STUDY DESIGN:** A retrospective comparative study.

**PATIENT SAMPLE:** The study group included 203 males, and the control group included 362 males who were matched for age, race, and body mass index with the study group.

**OUTCOME MEASURES:** The primary outcome was the presence or absence of GJL according to the Beighton scale. The secondary outcome measures included the clinical outcome according to a visual analog scale and the Oswestry disability index and the radiological outcome.

**METHODS:** We compared baseline data between groups, and we evaluated the impact of GJL on outcomes after different types of several treatment for LDH.

**RESULTS:** The prevalence of GJL was significantly higher in the study group (10.8%) than in the matched control group (4.4%) ( $p = .003$ ). In multivariate logistic regression analysis, GJL was the only significant predictor ( $p = .012$ ). For all treatment methods, patients with GJL had worse clinical outcomes than did patients without GJL. In the patients treated with lumbar discectomy surgery, the differential Cobb value at the last follow-up was higher in the GJL patients than in the non-GJL patients ( $p = .001$ ).

**CONCLUSIONS:** Generalized joint laxity was closely related to p-LDH and may be a causative factor. In addition, patients with GJL had worse clinical and radiological outcomes than patients without GJL. Consequently, GJL should be evaluated preoperatively, and this information should be communicated to p-LDH patients with GJL. © 2015 Elsevier Inc. All rights reserved.

## Keywords:

Generalized joint laxity; Disc herniation; Treatment; Lumbar spine; Beighton scale; Clinical outcome

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## Introduction

Numerous studies have explored causative factors for primary lumbar disc herniation (p-LDH). One potential causative factor is the extent of lumbar segment motion; however, the relationship has not been thoroughly described [1–4]. This stands in contrast to orthopedic studies of the knee and shoulder, in which clinicians have extensively evaluated the relationship between joint hypermobility, termed “generalized joint laxity” (GJL), and specific disease entities, such as shoulder dislocation or

## EVIDENCE & METHODS

### Context

Generalized joint laxity (GJL) has been hypothesized to play a role in the development of numerous spinal disorders. Its influence on outcomes following treatment for spinal conditions is less well known. The authors sought to evaluate the impact of GJL on outcomes after treatment for primary lumbar disc herniation.

### Contribution

This was a retrospective matched case-control study involving 565 patients. For all treatment modalities, patients with GJL had worse clinical outcomes than those without the condition.

### Implications

Due to its retrospective design, this work cannot demonstrate a causative effect of GJL on the development of disc herniation. Rather, it is only able to identify statistical associations that were more frequently encountered within the study cohorts. The investigation may be subject to selection bias in terms of the treatment regimens employed and the sample may limit the amount of clinical variation present, particularly in light of the fact that only 22 patients with GJL were present in the study group and treatments were heterogeneous. In addition, as the authors recognize in their limitations section, a true diagnostic gold standard for GJL has not been established. These factors may impair the wide translation of these findings to patients in standard clinical practice.

—The Editors

anterior cruciate ligament injury [5–9]. The term GJL was first used in 1967 to describe musculoskeletal symptoms in the presence of joint laxity that were not attributable to other disease [10,11]. Its relatively benign nature became apparent as the multisystemic extent of the condition became better appreciated. However, GJL has been suggested to be a major causative factor of chronic joint pain and has, therefore, been widely evaluated in this context [6,10,12–14]. Recent studies have suggested associations between GJL and spine-related disorders such as low back pain, accelerated disc degeneration, and recurrence after discectomy surgery for p-LDH [1,2,4,6,10,11,13,15,16]. Although GJL might be a causative factor of p-LDH, the relationship has been poorly studied. In addition, the impact of GJL on outcomes after treatment for p-LDH has not been reported.

We investigated the relationship between GJL and p-LDH and compared the clinical and radiological outcomes post-therapy in p-LDH patients with or without GJL. To our knowledge, this is the first study to address the role of GJL in the occurrence of p-LDH and in outcomes after treatment for p-LDH.

## Methods

### Participants

This retrospective case-control study investigated GJL in young male patients with or without p-LDH. We also reviewed demographic data and outcomes after conservative treatment, selective nerve root block (SNRB), or lumbar discectomy (LD) surgery in patients with p-LDH, regardless of whether they had GJL.

For all enrolled patients, SNRB was performed if the patient had obvious LDH findings on magnetic resonance images and had symptoms or signs of LDH. In addition, patients only received SNRB if they did not experience successful improvement in lower extremity radiating pain despite conservative treatment with medication and physical therapy for at least 3 months. Successful improvement was defined as more than 50% improvement in preoperative pain intensity after conservative treatment and maintenance of this improvement for at least 1 month. Lumbar discectomy was performed if patients had no improvement after two rounds of SNRB and showed aggravated neurologic impairment of the lower extremity, such as motor weakness and cauda equina syndrome.

This study included individuals between the ages of 20 and 30 years who had tried conservative treatment or received SNRB or LD surgery of the lumbar spine after the diagnosis of p-LDH and who were followed up for at least 2 years after surgery. Patients were excluded if follow-up was less than 2 years or if they were unable to accurately respond to preoperative and postoperative questionnaires because of medical problems during regular follow-up times. All patients were informed before surgery about the details of their therapeutic modalities, including type, timing, difficulty, and potential complications. Informed consent was obtained from all patients.

### Subjects

The study group comprised 203 males who met the inclusion and exclusion criteria at a single hospital from 2010 to 2011. The control group comprised 362 males from an outpatient clinic, who were matched for age, race, and body mass index (BMI) with the study group to control for demographic biases. To minimize sampling bias, recruitment was performed on a large scale of more than 10,000 individuals and did not target specific individuals. Potential participants were informed that their decision to participate was voluntary and that refusal to participate would not affect their treatment.

### Outcome measures

The primary outcome measure was the presence or absence of GJL. The Beighton scale was used to determine whether GJL was present, and assessment of the joint range was performed with a standard clinical set of goniometers

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