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The role of conservative treatment in lumbar disc herniations: WFNS spine committee recommendations

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1. Introduction

cations.

ABSTRACT

Objective: To formulate the most current, evidence-based recommendations for the conservative management of lumbar disc herniations (LDH).

Methods: A systematic literatüre search was performed 2012–2022 in PubMed/Medline and Cochrane using the keywords "lumbar disc herniation" and "conservative treatment," yielding 342 total manuscripts. Screening criteria resulted in 12 final manuscripts which were summarized and presented at two international consensus meetings of the World Federation of Neurosurgical Societies (WFNS) Spine Committee. The Delphi method was utilized to arrive at three final consensus statements.

Results and conclusion: s: In the absence of cauda equina syndrome, motor, or other serious neurologic deficits, conservative treatment should be the first line of treatment for LDH. NSAIDs may significantly improve acute low back and sciatic pain caused by LDH. A combination of activity modification, pharmacotherapy, and physical therapy provides good outcomes in most LDH patients.

2. Methods

We performed a literature search in Pubmed, Medline and Cochrane 2012–2022 using the keywords "lumbar disc herniation" and "conservative treatment". Initial search yielded 342 manuscripts. We excluded duplicate articles, those without full text available, non-English articles, non-human studies, and case reports with <50 patients. These screening criteria (as shown in Fig. 1) resulted in 12 final articles that covered the following topics¹: Type of conservative therapy used for LDH, and² Effectiveness of conservative therapy in treating LDH (see Table 1).

These data were summarised and presented at two international meetings of the World Federation of Neurosurgical Societies (WFNS) Spine Committee, the first in Karachi, Pakistan and the second in Istanbul, Turkey. Participants voted on consensus statements using the following Likert scale: 1 = strongly disagree, 2 = disagree, 3 = somewhat agree, 4 = agree, 5 = strongly agree. All voters were attending neurosurgeons who are spine experts and members of the WFNS

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physical therapy, and/or epidural transforaminal

Lumbar disc herniation (LDH) is the most common degenerative

disease of the spine, with a prevalence of 2–3%.¹ Nevertheless, only a

small percentage of patients (<10%) are candidates for surgical inter-

vention.² Red flags that necessitate urgent surgery include progressive

significant weakness of the lower extremities and/or cauda equina

syndrome. In the absence of red flag symptoms, conservative ther-

apy-including non-steroid anti-inflammatory drugs or narcotic medi-

injections—should be the first line of treatment.³ In this paper, we re-

view the recent literature and summarize the results of the World

Federation of Neurosurgical Societies (WFNS) Spine Committee

consensus meeting for the role of conservative therapy in LDH.

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Abbreviations					
WFNS	World Federation of Neurosurgical Societies				
MRI	Magnetic resonance imaging				
CT	Computed tomography				
PRISMA	A Preferred Reporting Items for Systematic Reviews and				
	Meta-Analyses				
LDH	Lumbar disc herniation				
APS	American Pain Society				
ACP	American College of Physicians				
NSAIDs	Nonsteroidal anti-inflammatory drugs				
COX-2	Cyclooxygenase-2				

committee. Results are presented as percentage of respondents who agree³⁻⁵ and those who diagree.^{1,2} Consensus was achieved when agreement or disagreement were \geq 66%, respectively.

3. Results and discussion

3.1. Definition of "conservative therapy"

The term conservative therapy refers to all treatment modalities for LDH except surgery. This includes pharmacological and nonpharmacological treatments including physical therapy, injections, and other minimally-invasive procedures, as discussed below.

3.2. Pharmacological therapy

3.2.1. Acetaminophen

Both the American Pain Society (APS) and the American College of Physicians (ACP) recommend acetaminophen as the first-line of treatment against low back pain of any duration. Although it might be not be as effective as other agents for severe pain, it is still the first choice due to its low adverse effects.⁴

3.2.2. Nonsteroidal anti-inflammatory drugs (NSAIDs)

NSAIDs inhibit cyclooxygenase-1 (COX-1) and cyclooxygenase-2 (COX-2) enzymes, resulting in anti-inflammatory and analgesic effects, and are frequently used for discogenic pain. In Roelofs et al.'s Cochrane review, the authors stated that non-selective NSAIDs are superior to placebo for relieving low back pain without the need for additional analgesics.⁵ There is no published evidence that one individual NSAID is superior to another for treating LDH pain.

3.2.3. Muscle relaxants

The term muscle relaxant is used for the group of medications that relax skeletal muscles via various mechanisms. One commonly used group is thiocolchicoside, a GABA-mimetic drug, which also has antiinflammatory and analgesic effects. Other agents like carisoprodol (soma), cyclobenzaprine (flexeril), and metalaxone (skelaxin) can also be used for the treatment of acute low back pain, despite known side effects such as gastrointestinal problems, dizziness, and headaches.⁶ Muscle relaxants like the calcium-channel blocker dantrolene or the gamma-aminobutyric acid modulator baclofen should generally not be used for treatment of low back pain, as their therapeutic purposes are



Fig. 1. Flowchart depicting screening algorithm for papers.

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aimed for treatment for muscle stiffness related to spinal cord injuries, cerebral palsy, or stroke.4

3.2.4. Opiods

The use of opiods for the treatment of low back pain is controversial due to serious side effects including physical dependency and withdrawal symptoms such as as gastrointestinal discomfort, irritability, and headaches. In fact, Alford reported that chronic back pain is commonly used as an excuse for long-term opioid prescriptions and does not positively affect quality of life or reduce symptoms.⁷ High-quality data for the long-term use of opiods specifically for LDH-related pain is lacking. Nevertheless, Tramadol, a µ-opiate agonist acting as a norepinephrine and serotonin reuptake inhibitor, is shown to have remarkably beneficial effects on radicular pain caused by LDH, with fewer adverse effects than other opioids.8

3.3. Non-pharmacological treatment

3.3.1. Physical therapy

Physical therapy plays an important role in the management of discogenic pain. Back extension exercises, like the McKenzie extensionprogram and behavioral posture changes, have been shown to improve LBP by causing anterior migration of disc tissue. Similar results may be achieved by yoga or tai-chi extension-based excersises. Flexion movements, however, may lead to posterior disc mifration and further aggravate LDH-related pain.⁹ The effect of physical therapy on radicular pain remains controversial.

Summary of the reviewed papers.

3.3.2. Traction therapy

As a part of a physical therapy program, traction therapy-either manually or with traction devices-aims to reduce the mechanical load of the disc and expand the neural foramina. Most case series and metaanalyses, however, indicate that traction only temporarily improves LBP or radicular pain and poses serious risks including traction-induced nerve injury, ligament tears, or vertebral fractures. Traction does not appear to have a beneficial effect on spinal mobility.¹⁰

3.3.3. Bed rest

Limiting all physcial activity for more than two days is defined as "bed rest". In a retrospective cohort of 23 patients with LDH, Altun et al reported that 2 weeks of bed rest reduced low back pain due to LDH.¹¹ In their meta-analysis of 49 studies, however, Jordon et al found that bed rest may be no more effective than watching waiting at improving pain scores at 12 weeks in patients with sciatica.

3.3.4. Traditional medicine

Traditional medicine like accupuncture and cupping therapy have been practiced for over 2000 years in China, India, and the Middle East and are becoming more popular in the western world. Although there are a handful of low-quality studies supporting the benefits of traditional medicine, a large meta-analyis published in 2005 stated that accupuncture may provide immediate or short-term relief of chronic LBP, but there is insufficient high-quality evidence showing a positive effect on discogenic pain.¹³

No	Study	Evidence Level	Number of patients	Main target	Conclusions
1	Zhang B. et al, 2017	1	Metaanalysis of 80 papers	Evaluation of the effect of non-surgical therapy (Chinese traditional medicine, pharmacotherapy and physical therapy) on lumbar disc hernia	Non-surgical therapy has favorable outcomes in patients with lumbar disc hernia; traditional Chinese medicine (manual therapy, accupuncture etc) is favorable of having less side effects than pharmacotherapy
2	Boyraz I. et al, 2015	3	65	Comparison of high-intensity laser therapy and ultrasound treatment in patients with lumbar discopathy	HILT and US treatment are effective in lumbar discopathy and had longer positive outcomes compared to pharmacotherapy only
3	Paul CP. et al, 2017	2	125	Evalutation of static axial loading on intervertebral disc space in a goat biomechanical model	Concurrent static axial loading results in the posterolateral part of the intervertebral disc
4	Altun I. et al, 2017	3	23	Investigation of effect of bed rest on lumbar disc hernia	Bed rest positively reacts on lumbar disc hernia-induced pain in combination with pain therapy
5	Kreiner DS. et al, 2014	1	Review based on 29 clinical questions	What is the likihood that a patient with lumbar disc herniation and radiculopath undergoing medical treatment would have good/excellent functional outcomes at short, medium and long term?	Medical treatment is suggested to improve functional outcomes in most patients with lumbar disc herniation and radiculopathy
6	Kaye AD. et al, 2021	1	Review of 21 trials	Comparision of the different administration routes of epidural injections	Epidural injections with local anesthetic and steroid showed level I evidence for transforaminal and interlaminar approaches; local anesthesia alone was noted as level II evidence; Caudal injections with local anestehsia or steroids showed level II efficacy
7	Jordan JL. et al, 2011	1	37 reviews	Investigate the effect of epidural steroid injections on lumbar disc hernia	Epidural steroid injections are shown to improve limb pain and increasing patients' satisfactions at 2 weeks but show no effect after 2 weeks
8	Chiu CC. et al, 2015	1	31 articles	Evaluation of possibility of spontaneous regression of lumbar disc hernia	Spontaneous regression of herniated lumbar disc may result in 60–90% of patients
9	Hu D. et al, 2020	3	31	Comparision of 12 and 24-month follow-up of patients receivng conservative treatment and minimally-invasive percutaneous discectomy for lumbar disc herniation	Patients who underwent percutaneous discectomy had significantly better VAS scores than the ones who received conservative therapy
10	Demirel A. et al, 2017	3	29	Does non-invasive spinal decompression physical therapy effect the reabsorption of lumbar disc hernia?	Extension exercises reduce stress on the lumbar disc, wheras constant flexion movements may increase it
11	Gastaldi R. et al, 2019	2	54	Comparing the efficacy and safety of intravenous ketoprofen and methyprednisolone with placebo in sicatica	NSAIDs are effective for short-time symptomatic treatment of LBP; A higher propotion of patients relieved with intravenous methyprednisolone at day 3
12	Noble M. et al, 2018	1	4893	Evaluation the effectiveness of opiods on non-cancer pain	Despite significant relieve of pain, up to 23% patients showed serious adverse effects and discontinued opioid treatment. Improvement of quality of life were inconclusive

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3.3.5. Injections

Administration of local anesthesia, corticosteroids, or a mixture of both through the sacral hiatus, interlaminar space, neural foramen, or facet capsule has been widely performed for the non-surgical treatment of LDH. These injected agents are believed to reduce the inflammatory response of the herniated disc and reduce edema, thereby decreasing neural compression. Althogh injection therapies, are beneficial in selected LDH patients, long-term outcomes are worse than surgical outcomes, particularly when focusing on radicular pain. They can be useful in patients with significant comorbidities who are not suitable surgical candidates or in patients who wish to avoid surgical intervention. However, reports indicate that a high portion of patients undergoing injection therapy may still end up requiring surgery in the longterm.¹⁴

3.3.6. Intradiscal interventions

The majority of herniatied discs are filled with water. As a result, intradiscal interventions like nucleoplasty with lasers or radiofrequency via a temperature-controlled resistive heating coil are believed to work by evaporating the water content of the disc tissue, thereby reducing the herniated mass with thermal energy and also denervating the annulus. Reports show short-term improvement in LBP and radiculopathy, but there is insufficient evidence that intradiscal therapies provide long-term benefit in the treatment of LDH-associated pain, and many patients may still require surgery in the future.¹⁵

3.3.7. WFNS spine committee recommendations

Following two rounds of voting in the international consensus meetings, the WFNS Spine Committee produced the following recommendatons on the conservative treatment of lumbar disc herniations:

- 1) NSAIDs have significant positive effect on improving acute low back and sciatic pain caused by LDH
- 2) Conservative treatment is recommended as the first-line treatment for LDH in patients who do not have neurologic deficits such as motor deficits or cauda equina syndrome.

4. Conclusion

LDH-related low back pain and radiculopathy represents one of the most common health conditions worldwide. In the absence of cauda equina syndrome, motor, or other serious neurologic deficits, conservative treatment should be the first line of treatment for LDH. A combination of activity modification, pharmacotherapy, and physical therapy provides good outcomes in most LDH patients.

Ethics approval and consent to participate

Not applicable.

Availability of data and materials

The raw data supporting the conclusions of this manuscript will be made available by the authors, without undue reservation, to any qualified researcher.

CRediT authorship contribution statement

Onur Yaman: Writing – original draft, Data curation, Conceptualization. **Artem Guchkha:** Writing – original draft, Data curation, Conceptualization. **Sandeep Vaishya:** Writing – review & editing, Data curation, Conceptualization. **Mehmet Zileli:** Writing – review & editing, Data curation, Conceptualization. **Corinna Zygourakis:** Writing – review & editing. **Joachim Oertel:** Conceptualization, Project administration, Writing – review & editing.

Declaration of competing interest

The authors declare that they have no competing interests.

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