

Therapeutic Considerations and Recovery in Low Back Pain: Williams vs McKenzie

Mircea MOLDOVAN¹

Abstract

Low back pain (LBP) is one of the most common musculoskeletal disorders. It is associated with high costs in medical assistance and indirect losses through temporary work incapacity. Therefore, it represents a challenge for medical practice. There are many types of treatments and recommendations depending on doctors' knowledge and opinions, but two protocols stand out due to their "popularity": the Williams and McKenzie protocols. Given the duration of flares and relapses rate, it is important to apply an efficient and lasting treatment. This is why the aim of the present study is to compare these two protocols, McKenzie and Williams, in terms of principles and exercises, in order to reveal which one is more suitable in LBP recovery. In the end, the McKenzie protocol proved to be superior to the Williams program in terms of pain relief, lumbar mobility and number of sessions needed to recover. Another finding was that the two programs are not totally contradictory, but they are just applied in different stages of the LBP syndrome, depending on several anatomical and pathological factors.

Key words: *Low back pain, Williams, McKenzie, treatment*

Rezumat

Durerea lombară este una dintre cele mai comune afecțiuni musculoscheletale. Este asociată cu costuri mari în asistența medicală și pierderi indirecte prin incapacitate temporară de muncă și reprezintă o provocare în practică medicală. Variantele de tratament sunt variate și recomandate în funcție de cunoștințele și opiniile fiecărui doctor în parte, însă două protocoale ies în evidență ca „popularitate” și anume programul Williams și McKenzie. Având în vedere durata puseelor și rata recurențelor este important aplicarea unui tratament eficient și durabil. De aceea am ales să compar cele două metode de tratament, Williams și McKenzie din punct de vedere al principiilor folosite și al exercițiilor cu scopul de a releva care dintre cele două este mai potrivit în recuperarea sindromului dureros lombar. În urma documentării am ajuns la concluzia că protocolul McKenzie este superior programului Williams privind ameliorarea durerii, a mobilității lombare și a numărului de ședințe necesar recuperării. Analizând îndeaproape cele două programe, se poate spune că nu sunt în contradicție totală, ele doar aplicându-se în diferitele stadii ale sindromului dureros lombar în funcție de mai mulți factori anatomopatologici.

Cuvinte cheie: *Durere lombară joasă, Williams, McKenzie, tratament*

¹Master student, Physical Education and Sport Faculty, West University of Timișoara, email: eamon_mik@yahoo.com

Introduction

Low back pain is a painful clinical, biopsychosocial syndrome with multiple etiology, characterised by pain between the twelfth rib and the sacrum, associated or not with radiation to the lower limbs, causing limitation of current activities and disability. LBP is one of the most common syndromes and it represents a challenge for the medical community.

LBP incidence in adults varies according to age. Most surveys conducted in different countries concluded that 80% of the world population had at least one LBP episode and that the 20% remaining have forgotten about it or have not paid attention to it. As people grow older, the risk of having back pains increases, for women mostly after the age of 40, while for men after the age of 50. Most episodes of back pain are short and weak and do not affect daily life. Recurrences are common, representing 14% of all those who have had multiple episodes of back pain. The emergence of low back pain is influenced by the combination of several anatomical factors: age, working and environmental conditions, racial, psychosocial and incidental factors. [1]

Direct and indirect costs of low back pain in terms of quality of life, productivity and professional absenteeism are enormous, making this one of the most widely spread musculoskeletal syndrome that causes disability.

Data from literature are inconsistent regarding the recovery in case of a low back pain. Studies show, however, that it does not cure by itself. Treatment varies from conventional methods (physiotherapy, kinetotherapy, massage) to modern methods like ozone therapy, but the objectives are the same: pain control, disability prevention, resuming of suppressed daily activities and of work.

Applying an appropriate treatment is important given the duration of flares and the relapses rate.

Therefore my study will explore the two most widespread methods, Williams and McKenzie. The aim is to reveal which of these methods is more suitable in the recovery from LBP syndrome.

The Williams method

The exercises proposed by Dr. Williams were designed for men under 50 years and women under 40 years which had a lumbar hyperlordosis, whose radiography showed a contraction of the lumbar segment interarticular space. The purpose of the exercises was to reduce pain and to ensure stability of the lower trunk by toning the abdominal muscles, buttocks and hamstrings, altogether with the passive extent of hip flexors and sacrospinalis muscles. [2]

His technique advanced over time, setting the goals of kinetotherapy according to the syndrome stage: acute, subacute, chronic or complete remission. In the acute stage we apply general relaxation methods on the lumbar muscles. The actual kinetotherapeutical program begins in the subacute stage, when besides relaxation methods, a series of techniques to strengthen the lower torso are being applied.

In the first stage, the patient is treated from a kinetic point of view only in supine position, by discharging the weight of the patient's torso. "A vicious circle" is being created at the level of the motor nerves and muscles of the lower region of the back. Lower-back morbidity is actually a mechanical-disco-radicular conflict accompanied by local inflammation. Irritation and inflammation lead to pain and pain produces muscle stiffness. To close this vicious circle, muscle contractions of the abdominals and of the iliopsoas is necessary, which leads to the relaxation of the paravertebral muscles. Kinetic exercises in this phase also contributes to the partial recovery in lumbar joint suppleness. Even limited movement obtained during exercise helps to feed the disc and to restore its height by absorbing

liquid, called inhibition phenomenon. This phase lasts for about 2 weeks.

In the second stage of the program, the exercises prepare the backbone to support a heavier weight when in a vertical position. Basically it is about switching from a horizontal position to a vertical one. This verticalization complies with the principles of accessibility and gradual loading. Exercises from the first stage become warm-up exercises for the second stage. The verticalization will be performed gradually, by using exercises which allow the patient to make this transition painlessly.

In the third stage, the clinical remission is already achieved and the program aims at the rectification of the pelvis, restoring body symmetry, fighting bad attitude standing and walking, eliminating vicious attitudes and providing the patient with an accessible exercise program (at home) with the purpose of preventing and improving body outfit control. Physical therapy continues by toning the lumbar area. The aim of toning the abdominal muscles and back extensors, in orthostatism, is to achieve a neutral position of the pelvis and to create an abdominal pressure capable of taking some of the pressure placed on the lower lumbar intervertebral discs. Getting a neutral position depends upon stretching the extensor lumbar muscles (paravertebral muscles and iliopsoas) and toning the abdominals (which pull the pube up) and the buttocks (which pull down the posterior part of the pelvis) [1,2].

The McKenzie method

McKenzie is a method of evaluation and treatment of static spinal disorders developed by the physiotherapist Robin McKenzie. This method of diagnosis and treatment is based on a philosophy that encourages the patient to be in control of the treatment. R.A. McKenzie's concept of treating LBP

is based on allegations that predisposing factors in the occurrence of this disease are a prolonged sitting position with kyphosis and an increased frequency of lumbar flexion. Therefore, the lack of lumbar extension leads to a higher predisposition of LBP.

The McKenzie program is a set of exercises whose effectiveness is valid during the chronic phase as well as during the acute one. This program uses a series of progressive exercises designed to locate and eventually eliminate the patient's pain. Exercises must be individualized for each patient, incorporating only those movements that lead to the neutralization of symptoms. Specific to the Mckenzie program is correcting any lateral movement and passive extension exercise that encourage the movement of the nucleus pulposus towards the central region. The key of this protocol is to reduce the protrusion of the intervertebral disc in order to form a scar that would protect it against further injuries. The patient should refrain from any activities and positions that increases intradiscal pressure or posterior pressure on the core of the disc. Once the protrusion seems to be stabilized, it is essential to regain full mobility of the lumbar backbone. Passive exercises and joint mobilization are indicated when mobility is limited, pursuing full amplitude of motion in all directions. [3]

Unique to this method is the algorithm that leads to a simple classification of the back pathologies. It is based on a cause-effect relationship among the disease history, pain response in motion tests, different body postures and activities during the evaluation process. A systematic progression of applied resistance (cause) uses the pain response (effect) to monitor changes in movement and functioning. Static disorder can be quickly identified by clinical signs for each patient. So Mckenzie

classifies back pathologies into: derangement, dysfunction or postural syndrome.

The McKenzie specific program is based on lumbar extension exercises, and on lumbar flexion ones. These are not fixed or divided into different stages, but comply with the principle of progressivity, and their aim is centralizing pain, pain relief and regaining functionality. [1,3]

However this method has its limitations: it is contraindicated when at the roots of the sciatic nerve occurs an inflammation (a swelling that can irradiate a part of or the entire sciatic nerve) and the pain becomes acute and persistent. Another contraindication to this method is given by the unilateral or bilateral contraction of the paravertebral muscles. Applying this method does not help the contractures of the muscles. Also, this method is absolutely contraindicated when there is numbness on different muscle groups of the affected lower limb, even if the pain does not become more severe. In these situations, the remaining effective kinetic method is the Williams program, which aims primarily at preserving remaining functions.

McKenzie vs Williams

The techniques used for treating low back pain are many and varied, yet all have something in common, namely the lack of studies regarding their efficiency. The purpose of this comparison is to highlight which of the two protocols, Williams and McKenzie have better efficacy in terms of recovery time, pain relief and recovery of lumbar spine mobility. The two protocols are probably the only methods to cure low back pain which differ both in theory and in practice. Williams suggests that a person, in forcing his body to stand erect, severely deforms his spine, redistributing the body weight on the posterior area of the lumbar intervertebral discs. At the fourth and

fifth lumbar levels, great pressure is exerted on the posterior aspect of each vertebra and transferred from the vertebra to the disc. The solution found by Dr. Williams is to have the patient perform exercises and comply with the postural principles which serve to decrease the lumbar lordosis to a minimum, thereby reducing the pressure on the posterior elements of the lumbar spine.

There are other investigators who also support Williams' theory. Fahrni(1) reports that although it cannot be stated that all low back pain is caused by the intervertebral disc, it can be claimed that ". . . pain is produced largely by postural lordotic forces and even in those who do not have the pain yet, there is an underlying deterioration process progressing in the lumbar spine. There is ample confirmation for this in observations of tribal populations, where the flexed posture is adhered to, and back pain and disc degeneration are minimal both clinically and radiologically". [4]

On the other hand, McKenzie believes that all spinal pain can be attributed to alteration of the position of the nucleus pulposus in the disc, in relation to the surrounding annulus; mechanical deformation of the soft tissue about the spine which has undergone adaptive shortening; or mechanical deformation of soft tissue caused by postural stress. Pain occurrence is natural because the nucleus pulposus edges are highly innervated and pressure acts like a mechanical aggression on the annulus. The result is that as the nucleus pulposus penetrates to the edge of the annulus, the pain becomes more intense. The creator of this method also noted that this "migration" to the edges of the nucleus pulposus disc is usually a result of a prolonged postural stress (e.g. prolonged driving) which entails pain and dysfunction, affecting also the facet joints and all the other soft tissues.

Most often, postero-lateral nucleus pulposus migrates to areas that are just conjugation holes.

McKenzie recommends exercises and postural instructions which restore or maintain the lumbar lordosis. It should be noted that although exercises involving lumbar spine extension are emphasized in this protocol of treatment, particularly in the early stages, lumbar flexion exercises are usually added at a later time in order for the patient to have a full range of spinal flexions and extensions.

Studies investigating the movement or shifting of the nucleus pulposus of the disc in response to vertebral movement were first described by Armstrong. Later Shah et al demonstrated the anterior to posterior movement of the nucleus during lumbar flexion (decreasing the lumbar lordosis) and the opposite movement of the nucleus during extension (increasing the lumbar lordosis).(1)

The posterior movement of the nucleus during flexion could result in increased pressure on the numerous pain-sensitive structures of the posterior lumbar spine, while lumbar extension could result in the movement of the nucleus away from these structures.(1)

Williams and McKenzie protocols are completely different, yet both are still prescribed according to the knowledge and opinions of each doctor despite the fact that there are few clinical studies demonstrating their effectiveness.

To highlight the differences between the two programs I have chosen a study realised by David Joseph Ponte and published in the Journal of orthopaedic and sports physical therapy. The study was built on a sample of 22 subjects (10 were doing McKenzie's program, while the other 12 were doing William's program), with ages between 21 years and 55 years, based on some criteria: limitation of flexion, extension and lateral movement, pain in the lower region of the back for at least 3 weeks and without any severe back problems.

The study used the following measurements (initial and final): pain measurement on a scale from 1 to 10 and the span of time the patient sits comfortably without any pain; forward flexion; lateral flexion and the Lassegue test (passive leg raise) (tables I-III, figure 1). The treatment consisted of exercises specific to each program for the two groups during eleven sessions.

Table I. Mean and SD of initial evaluation scores for Williams and McKenzie groups [1]

Measurement	Williams (N=10)	McKenzie (N=11)
Pain (1-10)	6.75 ± 1.62	5.59 ± 2.40
Sitting (mm)	41.59 ± 33.59	10.25 ± 8.52
Forward flexion (cm)	50.60 ± 14.54	50.25 ± 16.52
Lateral flexion (cm)		
left	52.45 ± 8.68	52.88 ± 5.29
right	52.50 ± 8.58	50.50 ± 7.01
Straight leg raise (degrees)	23.65 ± 10.05	39.27 ± 14.67

Table II. Mean and SD of final evaluation scores for Williams and McKenzie groups [1]

Measurement	Williams (N=10)	McKenzie (N=11)
Pain (1-10)	3.55 ± 1.98	0.65 ± 1.60
Sitting (mm)	56.59 ± 46.25	100.83 ± 36.70
Forward flexion (cm)	37.50 ± 22.67	9.08 ± 10.55
Lateral flexion (cm)		
left	49.30 ± 9.70	47.08 ± 4.53
right	49.50 ± 9.85	46.04 ± 5.35
Straight leg raise (degrees)	44.90 ± 27.14	87.05 ± 8.16

Table III. Mean and SD of improvement scores for both treatments protocols

Subjects	Pain (0-100)	Sitting (min)	Forward (cm)	Lateral flexion (cm)		Straight leg raises(degrees)
				Left	Right	
Williams (N=10)	2.85 ± 1.73	15.00 ± 28.96	13.20 ± 11.50	2.30 ± 4.07	3.00 ± 4.84	20.80 ± 16.66
McKenzie (N=12)	4.90 ± 2.79	90.60 ± 36.48	48.10 ± 19.37	5.83 ± 5.06	4.50 ± 3.38	47.70 ± 16.02

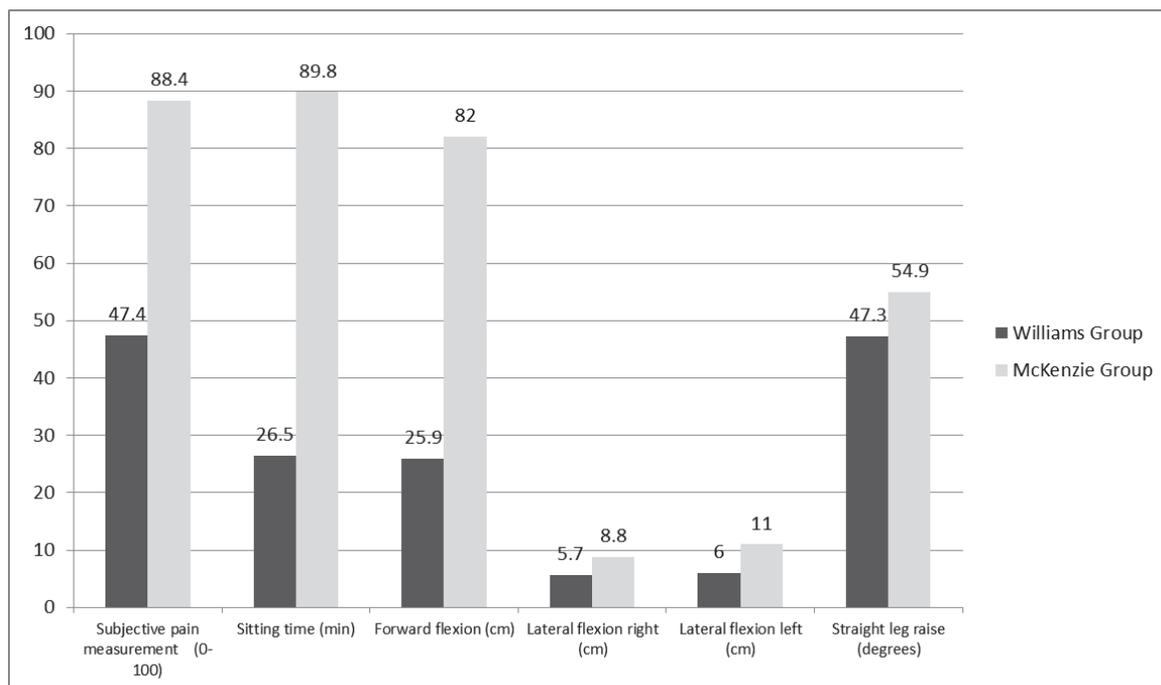


Figure 1. Percent improvement between pre- and posttreatment evaluation scores [1]

The findings of the study were the following: 1) *Subjective pain* – the results shows that McKenzie protocol was better in reducing pain, 67% of the patients declaring that at the end of the treatment they no longer experienced any sort of pain, while only 10% of the William group claimed that the pain was gone. 2) *Sitting time* – the patients in the McKenzie protocol managed to double their time from the initial evaluation, whilst the Williams group could not stay even half of the time of the other group. 3) *Forward flexion* – the McKenzie group realised a decrease of the index-soil distance. At the end of the treatment, 42% of the patients could reach the soil with their index and their legs straight,

whilst only 10% of the Williams group could reach the soil. 4) *Lassegue test* – 83% of the McKenzie group managed to raise their legs to 90 ° without experiencing pain. Only 20% of the Williams group could realise a pain-free range motion. 5) *Lateral flexion* – there was no significant difference between the two groups for lateral flexion to either the right or to the left. 6) *Treatment sessions* – a comparison of the average number of treatment sessions for the two groups revealed that the Williams group needed a significantly greater number of sessions than the McKenzie group.

Conclusions

These preliminary results of the study show that the McKenzie protocol is more efficient than the Williams one in terms of pain relief, pain occurrence while sitting, lumbar mobility without pain and the number of sessions necessary for recovery. But the study is not a complete success, as it shows the benefits and differences between the two programs on a short term. Therefore, given the recurrence rate of low back pain, an extensive long-term study is required.

The apparent contradiction between the two protocols does not consist of the opposite ways in which the movement is performed during the above mentioned programs, but in the different moments of the illness when the kinetic program is applied,

depending on the state, direction of movement of the nucleus pulposus and the surrounding affected tissues. For an experienced kinetotherapist, using one of these two protocols is not a random choice, but a well-informed decision. Thus, the two protocols do not contradict, but rather complement each other.

References

1. Ponte D.J. (1984) *A Preliminary Report on the Use of the McKenzie Protocol versus Williams Protocol in the Treatment of Low Back Pain*, Copyright 1984 by The Orthopaedic and Sports Physical Therapy Sections of the American Physical Therapy Association; 6(2):130-9.
2. Johnson Olubusola E. (2012) *Therapeutic Exercises in the Management of Non-Specific Low Back Pain*, Low Back Pain, Dr. Ali Asghar Norasteh (Ed.), ISBN: 978-953-51-0599-2
3. Field J. (2008) Exercises and management of lower back pain, *Clinical Chiropractic* 11, 199–204.
4. Liddle S.D. (2004) Exercise and chronic low back pain: what works?, *Pain* 107, 176-190.