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Benefits of stretching for lumbar mobility disorders at Murni Teguh Hospital Medan

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Abstract

The waist is the most important area as a point of strength for both legs located in the arrangement of the lumbar vertebra column 1 to the lumbar verbra column 5. The large lumbar vertebra is the structure that receives the most load on the sceletal system and is wider vertically in the front than in the back. Posture while working has a large influence on the accumulation of lower back muscle injuries, biomechanical factors related to static work postures and also standing and sitting postures. The research method used was pre-test and post-test, with a sample of 10 women and men aged around 25 to 55 years, and using the MAS (Modified Ashworth Scale) spasm scale measuring tool with a duration of 10-15 minutes of stretching exercise, and a waist stretching time of 4-5 weeks. and it was found that there was a significant influence carried out by physiotherapists, namely stretching exercises in the waist area with the aim of maintaining waist muscle strength and relaxing the waist.

Keywords: Streching, ,Mobilitas, Lumbal Rilexsasi,Fisioterapi

INTRODUCTION

The lower back is the most critical area as the point of support for the lower limbs, on the hips and comprising the lumbar vertebrae from L1 to L5. Each forms an intervertebral joint, which is a type of synovial joint (cartilaginous joint) with limited movement. The spine is supported by the wedge-shaped sacrum, which acts as a stabilizing bone for the spine and articulates with the pelvic bones at the sacroiliac joints. The sacroiliac joints consist of two types: synovial and fibrous joints, which have little to no movement. The large lumbar vertebrae bear the greatest load in the skeletal system and are wider vertically at the front than at the back, with short pedicles, broad spinous processes, and small transverse processes directed posteriorly, superiorly, and laterally. They have a thicker disc on the ventral side compared to the dorsal side, contributing to increased anterior concavity in the lumbar region. The human pelvis is a sturdy bony ring that connects the trunk to the legs; it consists of the sacrum, coccyx (tailbone), and a pair of innominate bones (ilium, ischium, and pubis). Its primary functions are to support body weight, protect internal organs (reproductive organs, bladder, rectum), and the hip joints. Primary Mechanisms of the Pelvis:

Body Weight Support (Biomechanics): The pelvis transfers body weight from the spine to the legs while sitting, standing, or walking. Stability and Mobility: The sacroiliac joints and pubic symphysis provide stability to the axial skeleton, while the pelvic muscles allow for hip movement. Pelvic Floor: The pelvic floor muscles (levator ani) act like a bowl to hold the organs in place, as well as regulate urinary and bowel functions. Mechanism of Childbirth (Women Only): The female pelvis has a wider and shallower structure to facilitate the birth canal. During childbirth, the pelvic floor muscles stretch, and the pelvis supports the descent, flexion, and rotation of the baby's head.

Among workers in the United States, lower back pain is a chronic condition affecting 1%–5% of the general population and recurring in 30%–70% of cases. It is generally caused

by a sedentary lifestyle (lack of physical activity), prolonged sitting, obesity, and mechanical injuries. Gender does not affect the prevalence of this condition; lower back pain is more common among those aged 25–50. Workers in Indonesia, particularly office workers, spend 8 hours a day in a seated position. This can have harmful effects on the lumbar vertebrae. In Indonesia, lower back pain is now commonly reported by young adults of working age, a phenomenon often referred to as "premature aging" due to unhealthy lifestyle habits. This is primarily caused by mechanical issues (muscle strain, sprains, poor sitting posture), which are frequently linked to office work or intensive use of electronic devices. 90% of lower back pain cases are nonspecific, typically resolving within a few days to 4 weeks.

The primary causes remain the same globally: muscle strain or sprain (from lifting heavy objects or bending), spinal abnormalities, or internal organ issues.
Recommended preventive measures include regular exercise, maintaining proper body posture (ergonomic), and maintaining a healthy weight. Lower back pain is a very common health problem among humans resulting from the adaptation to walking upright, and a sedentary modern lifestyle exacerbates this condition worldwide.

At Murni Teguh Hospital, in the Medical Rehabilitation Unit, we encounter numerous cases of lower back pain that interfere with daily activities, such as office work, field work, and household chores like cooking, cleaning, and caring for children. At Murni Teguh Hospital's Medical Rehabilitation Unit, lower back pain accounts for up to 70% of all cases in medical rehabilitation. This prompted me to conduct this community service research. The hip joint plays a crucial role in balance and postural control, acting as the center of stability for the lower body and spine. Here are the key points regarding the hip joint's influence based on the search results: Center of Stability and Postural Control: The hip joint, along with the surrounding muscles, is a key component of the "hip strategy" the body uses to maintain balance during large or rapid postural disturbances. Hip Muscle Strength: The strength of the hip abductor and extensor muscles significantly influences postural stability and dynamic balance. Weakness in the hip muscles is associated with an increased risk of falls, particularly among the elderly. Impact of Injuries and Medical Conditions: Disorders of the hip joint, such as osteoarthritis, pain, or post-total hip replacement (THR) surgery, often result in deficits in both static and dynamic balance. Hip Strengthening Exercises: Hip joint muscle strengthening programs (such as PNF, core stability exercises) have been shown to improve hip control, balance, sit-to-stand ability, and functional activities.

Postural Adaptation: The hip joint adapts to lower limb postural control by adjusting the pelvic angle to maintain balance' Functional relationships in the hip region involve complex interactions between bones, joints, and muscles that support body weight, enable dynamic movement, and protect internal organs. This region acts as a center of stability and mobility, particularly in connecting the lower spine (lumbar region) to the legs. The following are key points regarding the functional relationships in the hip region: Center of Stability and Weight Transmission (Lumbopelvic-Hip Complex/LPHC): The lumbar-pelvic-hip (LPH) region functions as a single unit that transfers load between the upper and lower body. Ball-and-Socket Joint Mobility: The hip joint is a ball-and-socket joint that allows for a variety of movements, such as flexion-extension (forward-backward), abduction-adduction (moving away-moving toward), and rotation. This facilitates functional activities such as walking, running, sitting, and climbing stairs.

Protection of Internal Organs: The pelvis serves as a protective framework for the organs in the lower abdomen, including the reproductive system, bladder, and intestines.

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Pelvic Stability and the Pelvic Floor: The pelvic floor muscles play a crucial role in supporting internal organs, controlling the bladder, and influencing sexual function.
Compensatory Movement: The lower back and hips have a strong functional relationship. If the hips experience stiffness or pain, the lower back (lumbar region) often compensates with excessive movement, which can lead to lower back pain.

1. Basic Anatomy and Biomechanics.
   Ball-and-Socket Joint: The hip joint connects the thigh bone (femur) to the pelvis. The ball-shaped head of the femur fits into the socket (acetabulum) in the pelvis, allowing it to move in various directions. Stability: This joint is reinforced by four major ligaments—three extracapsular and one intracapsular—making it one of the most stable yet dynamic joints in the body. Supporting Muscles: The pelvic floor muscles, such as the levator ani (comprising the pubococcygeus, puborectalis, and iliococcygeus), extend from the pubic bone to the tailbone, providing strong stability.
2. Pathomechanics of Hip Pain and Disorders.
   Hip pain occurs when joint mechanics are disrupted, which can be caused by: Trauma and Injury: Falls, accidents, or sports injuries can lead to fractures, labral tears, or joint dislocations, where the femoral head slips out of its socket. Muscle Imbalance (Lateral Pelvic Tilt): A condition where one side of the pelvis is higher than the other. This causes the muscles on one side to tighten (spasm) while the other side weakens, leading to lower back pain and functional leg length discrepancy. Degeneration and Disease: Aging causes cartilage wear, joint inflammation (arthritis), or avascular necrosis (AVN), where blood flow to the femoral head is disrupted. Repetitive Stress: Repetitive activities can cause bursitis (inflammation of the fluid-filled sacs in the joints.
3. Symptoms and Clinical Manifestations
   Localized Pain: Pain may be felt in the groin, the outer hip, or radiate down the leg. Limited Mobility: Pain often worsens when walking, sitting for long periods, or moving. Dysfunction: Weakened pelvic floor muscles can lead to problems such as urinary incontinence (inability to control urination).
4. Diagnostic and Management Approaches
   Examination: It is important to distinguish between intra-articular (within the joint) and extra-articular (outside the joint) pain through medical history, physical examination, and imaging. Exercise Therapy: Physical therapy exercises, such as stretching and strengthening, are essential for correcting lateral pelvic tilt and strengthening weakened muscles. Conservative Measures: Rest, ice packs, and the use of a seat cushion can reduce mechanical pain. The hips and gait are closely interrelated, with proper hip movement being crucial for stability and walking efficiency. Hip pain often results from an abnormal gait pattern. An ideal gait involves a smooth up-and-down movement of the hips—not side-to-side—supported by strong gluteal muscles.

The Relationship Between the Hips and Gait:
The Importance of Hip Muscles: Weak hip muscles, particularly the hip flexors, limit walking ability and mobility. Abnormal Gait: Walking with overly wide, twisting, or waddling steps is often caused by weakness in the thigh and hip muscles, according to. Hip Pain: Walking with an inefficient gait can cause hip pain, stiffness, and discomfort during activities.
Joint Health: It is noted that an incorrect walking pattern can increase the risk of arthritis due to uneven stress on the hip, knee, and spinal joints. Proper Walking Technique:Walk with an upright posture.Swing your arms naturally.Wear comfortable shoes.Ensure that hip movement is up-and-down rather than side-to-side, and opposite to the arm swing.Reducing Pain:

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Strategies to reduce hip pain while walking include taking shorter steps and increasing step speed. It is important to practice proper walking form to avoid long-term joint injuries.

Work posture has a significant impact on the development of lower back muscle injuries; biomechanical factors related to static work postures, as well as standing and sitting postures, play a role. For example, lifting tasks can be a source of lower back pain. To maintain a stable lower back position, daily stretching exercises should be performed on the lower back muscles, as these muscles are complex and support the spine—particularly the lower back—ensuring the muscles remain stable. Stretching can improve muscle flexibility, thereby reducing muscle spasms and alleviating pressure on the nerves. The names of the lower back muscles are: Erector spinae (iliocostalis, longissimus dorsi), Latissimus dorsi, and Quadratus lumborum. Multifidus, Abdominal obliques. These muscles work together to perform extension (straightening), lateral flexion (bending), and rotation of the spine.

The lower back serves as the central point from which both legs can move, stand, and take steps to walk; like the iliopsoas muscle, it plays a major role in the legs—especially the knee—enabling them to lift, because the iliopsoas muscle is attached at its insertion to T12 and originates at L5, and it plays a role in maintaining lower back stability as well as maintaining standing balance in both lower limbs; this position is related to knee stability

The muscles of the hip joint generate the greatest force during hip extension; the largest muscle in the body, the gluteus maximus, works in combination with the hamstrings to produce hip extension. The muscles around the hip joint are engaged in various ways during walking, standing, sitting, daily activities, and climbing stairs. The hip muscles must be balanced so that the extensors do not exceed the strength of the flexors and the abductors are equal to the adductors, ensuring adequate control of the pelvis. Since all hip muscles are used to support all activities, exercise programs should be designed to maintain the muscles of the lower back, hips, and surrounding muscles. Exercises for the flexors are best performed in a supine or hanging position so that thigh strength can be developed by working against the force of gravity. Hip flexors attach to the trunk and cross the knee joint. Knee flexion can also increase hip flexion. It is easy to stretch the hip flexors by performing hyperextension of both the trunk and the thigh.

Hip extensors can be stretched to maximum hip flexion, combined with full knee extension. Stretching of the gluteus maximus can be enhanced by hip internal rotation and adduction.

Exercises for the abductors and adductors can be performed in a side-lying position so that these muscles work against the force of gravity. This position requires stabilization of the pelvis and lower back.

RESEARCH METHODS

Stretching exercises for the lower back are performed on a mat or bed for 10–15 minutes per session and continued for 4–5 weeks. The types of exercises are as follows: flexion to the chest, bridge exercise, strengthening exercises for both legs, and lumbar stretching exercises:: Seated Forward Bend, ankle pumping exercise, Bird Dog exercise, hip stretches, Cobra/back exercise, piriformis exercise. This study used a pre-test and post-test design with a sample of 10 subjects and utilized the Modified Ashworth Scale (MAS) to measure spasticity. According to the MAS criteria: 0 = No spasticity, MAS score 1 = mild spasticity, MAS score 2 = moderate spasticity, MAS score 3 = severe spasticity; after performing stretching exercises using several exercise methods, the results showed that 6 subjects did not experience muscle spasms based

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on a MAS score of 0, 3 subjects experienced mild muscle spasms based on a MAS score of 1, and 1 subject experienced moderate muscle spasms based on a MAS score of 2, and none experienced severe muscle spasms based on a MAS score of 3

RESULTS AND DISCUSSION

Data table Pre-test dan Post-test MAS

Subjects	MARK 0	MARK 1	MARK 2	MARK 3
1	^			
2		^		
3	^			
4			^	
5	^			
6		^		
7		^		
8	^			
9	^			
10	^			

Sample Tables and Figures

Tabel 1 stretching for impaired lumbar mobility

Artikel X	N	Ket.
1	Liffestyle Mobility Impairment	
2	Tuty Swarni Sinaga	

Figure1.Flexi to chest exercise on the waist

Instructions:
1. Lie on your back.
2.Pull one or both knees toward your chest.
3.Hug your knees.
4.Hold for 15–30 seconds.
5. Repeat 8–10 times.

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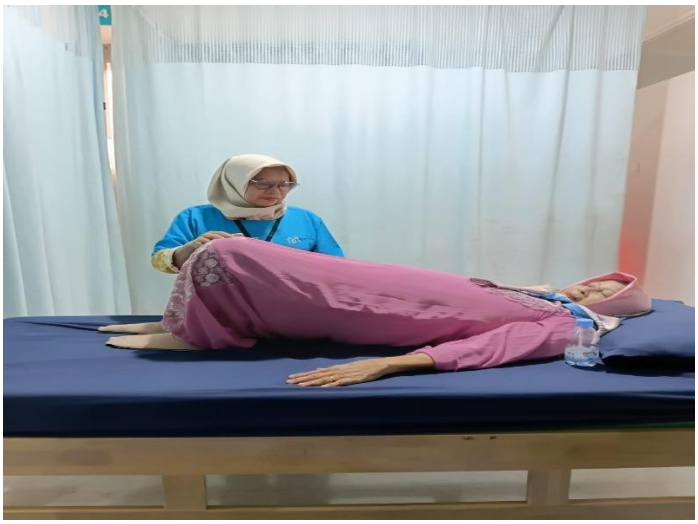

Figure2.Bridge exercise on the waist

Objective: Strengthen your abdominal muscles and relieve lower back pain

Instructions:

1. Lie on your back with your knees bent.
2. Place both hands at your sides.
3. Lift your hips off the ground.
4. Hold for 5–10 seconds.
5. Repeat 10–15 times.

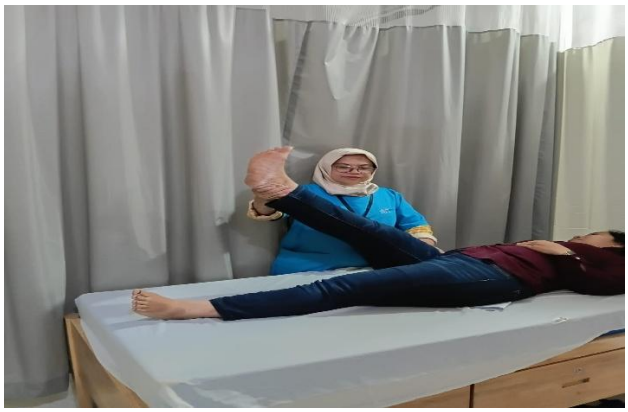

Figure3.Strengthening exercise exercise on the waist/straigh leg raise

Instructions:

1. Lie down with one leg bent and the other straight.
2. Raise the straight leg to about 30–45°.
3. Hold for 5 seconds, then lower it slowly.
4. Repeat 10–15 times per leg.

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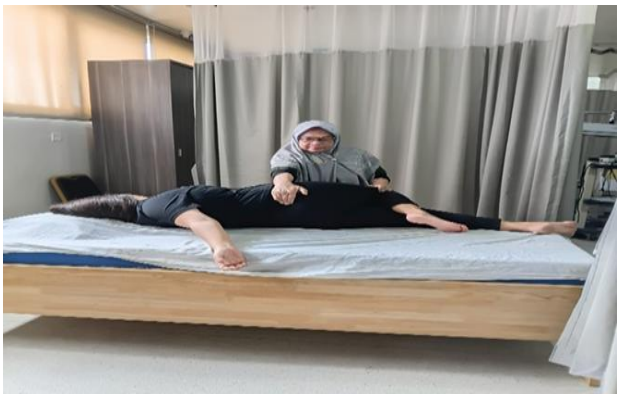

Figure 4:Streching exercise on the waist

Instructions:

1. Lie on your back.
2. Bend one leg while keeping the other straight, then lift your hips and
3. tilt your body toward the opposite side.
4. Hold for 15–30 seconds.
5. Switch sides.

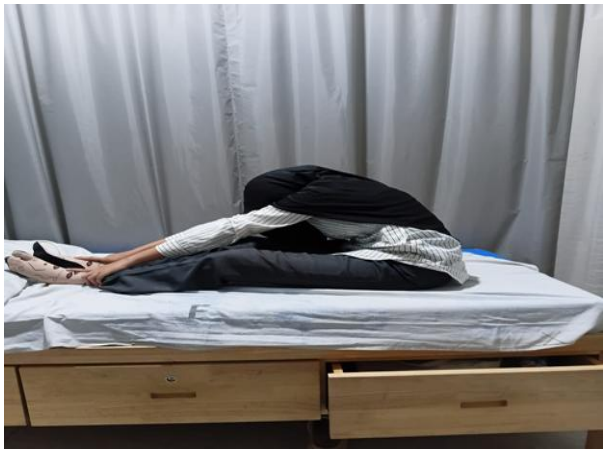

Figure 5: Seated Forward Bend

This is the position:

1. Sit with both legs extended straight in front of you
2. Lean your upper body forward
3. Reach your hands toward your feet or hold your toes
4. Bring your head close to or “kiss” your knees Benefits
5. Stretches the back and lower back muscles
6. Loosens the hamstrings (back of the thighs)
7. Reduces stiffness in the spine

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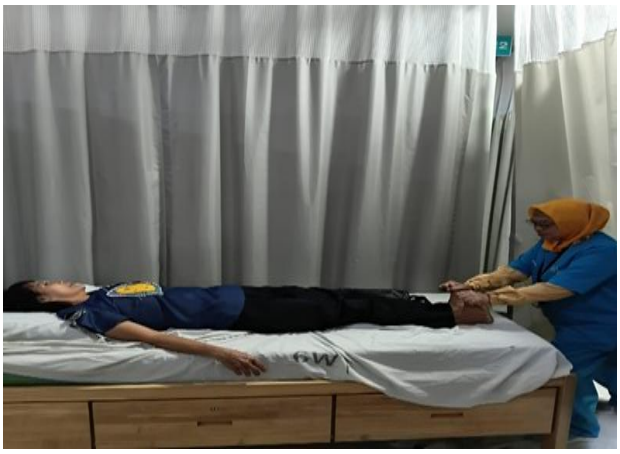

Figure 6:Ankle pumping exercise

Purpose: To improve blood circulation
Instructions:

1. Lie down or sit.
2. Move your ankles:
   Pull your toes toward your body
   Then push them away
3. Repeat 20–30 times.

Figure 7: Bird dog exercise

1. One arm extended straight forward
2. One leg extended straight backward
3. Head facing forward
4. Focus on balance and stability
5. Purpose of this exercise
6. To improve balance
7. To strengthen the core muscles (abdominals and back)
8. To improve spinal stability

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Figure 7: stretching on both hips

Instructions:

1. Seated position
2. Move your leg out to the side, away from your body.
3. Hold the position for 10–15 seconds.
4. Return slowly.
5. Repeat 10 times.

Figure 9:;cobra exercise/ Back Extension) Similar to the Bhujangasana yoga pose

Instructions:

1. Lie face down.
2. Place your palms beside your chest.
3. Slowly lift your upper body (keeping your hips on the floor).
4. Hold for 5–10 seconds.
5. Repeat 8–10 times.

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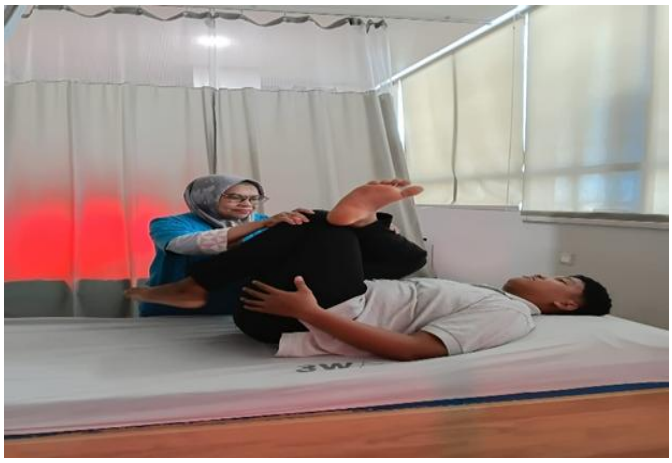

Figure 10:Piriformis exrecise:

How to do it:

1. Lie on your back.
2. Bend both knees, with the soles of your feet flat on the floor.
3. Place your right anklur left knee (like the number 4).
4. Grasp your left thigh, then gently pull it toward your chest.
5. Hold for 20–30 seconds, then switch sides.

Benefits:

Helps stretch the piriformis muscle and reduce pressure on the nerve.

Education on maintaining core muscle strength:

1. Maintain an ideal body weight. Here is the Broca formula for calculating ideal body weight.
5. For men: Ideal weight (kg) = (Height (cm) – 100) – (10% × (Height (cm) – 100)).
6. For women: Ideal weight (kg) = (Height (cm) - 100) - 15% × (Height (cm) - 100)
2. Ideal load: 60%–70% of the maximum weight you can lift.
3. Perform stretching exercises for the lower back after engaging in significant physical activity.
4. Swimming

CONCLUSION

After performing stretching exercises for 4–5 weeks, including: chest flexion, leg strengthening, cobra exercise, piriformis exercise, hip stretches, core stability exercises, ankle pumping exercises, seated forward bends, waist stretches, and pelvic tilting exercises,

positive effects on lower back spasms were observed. Specifically, 6 subjects felt relaxed or experienced no spasms, while 3 subjects still felt mild spasms, and 1 subject felt moderate spasms.

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