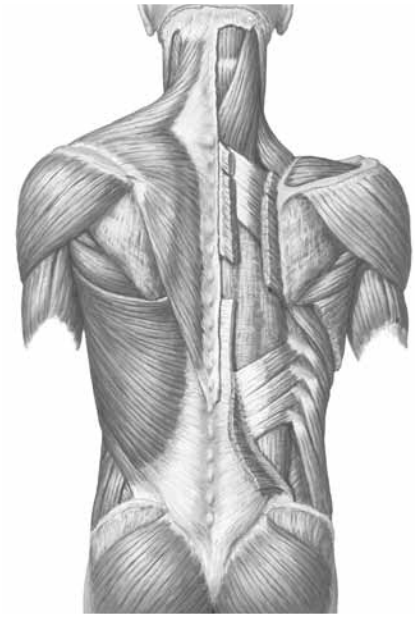
DeRoyal®

Self Management Program

Lumbar Spine

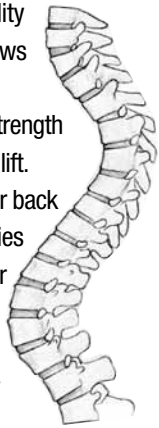
Improving Care. Improving Business.



What is the lower back?
It is a complex structure of vertebrae, discs, spinal cord and nerves. There are:

- **5 Bones or Lumbar Vertebrae –** stacked one upon the other, connecting the upper spine to the pelvis
- **5 Discs –** or shock absorbers that act both as a cushion and stabilizer to protect the lumbar vertebrae
- **Spinal Cord and Nerves –** that travel through a central canal in the lumbar vertebrae, connecting the brain to the muscles in the legs = neurological wiring system
- **Small Joints –** allowing functional movement and providing stability
- **Muscles and Ligaments –** providing strength and power while at the same time support and stability

Lumbar Spine:
(L1-L5) – the lower or lumbar spine is a complex structure that connects the upper body to the lower body. This important part of the spine provides both mobility and strength. The mobility allows movements such as turning, twisting or bending; and the strength allows you to stand, walk and lift. Proper functioning of the lower back is needed for almost all activities of daily living. Pain in the lower back can restrict activity, reduce work capacity and inhibit the quality of everyday living.



Indications for Lumbar Pain

- Chronic Low Back Pain
- Lumbar Muscle and Ligamentus Sprains and Strains
- Mechanical or Discogenic Lumbar Pain
- Discogenic Disc Disease

Definitions
Chronic Low Back Pain: is one of the most frequent problems treated by orthopaedic surgeons. Four out of five adults will experience significant low back pain sometime during their life.

Strains and Sprains: are similar disorders affecting different soft tissues of the spine. By definition, both conditions mean something has been stretched beyond its limits. Strains affect muscles, tendons or muscle-tendon combinations, whereas sprains affect ligaments. Strains and sprains most often result from excessive stress on the back – lifting something too heavy, a sudden fall, a car accident or sports injury can cause soft tissues to stretch beyond their capacity. When a load or force exceeds the muscles' ability to cope, the force is shared with the ligaments. When a ligament is stressed beyond its strength, it can tear. Local tissues will swell when ligaments, muscles, tendons or combinations become overstressed or torn. The symptoms of sprains and strains are sudden, sharp and persistent pain at the injury site, followed by swelling. Swelling causes pain, tenderness and stiffness that ultimately serves to help restrict movement.

Muscle: one of the contractile organs of the body that effects the movement of various body parts, classified as skeletal, cardiac or smooth. The bulk of the back is muscle. If enough force is applied to this soft tissue, damage or injury can occur. Muscles in the lumbar region provide power and strength for activities such as walking, standing and lifting. A strain of the muscle can occur when the muscle is poorly conditioned or overworked.

Tendon: a band of dense fibrous tissue that forms the termination of a muscle and attaches it to a bone. When the muscle contracts, it pulls on the tendon, which moves the bone.

Ligament: a cord, band or sheet of fibrous connective tissue, linking two or more bones, cartilages or other structures together. A ligament imparts stability, usually to a joint, preventing excess motion in certain directions.

Strain: the change in unit length (normal strain) or angle (sheer strain) in a material subjected to a load. It is a stretching or tearing of a musculotendinous unit. A strain can be arbitrarily classified as first, second or third degree.

- **First degree:** consists of minimal stretching of the musculotendinous unit without permanent damage
- **Second degree:** indicates partial tearing of the musculotendinous unit
- **Third degree:** indicates complete disruption of a portion of this unit. Swelling, bleeding and localized discomfort accompany a third degree strain, possibly producing temporary disability. Initial treatment following an acute strain should consist of ice application, immobilization of the musculotendinous unit and subsequent rehabilitation.

Sprain: a soft tissue injury limited to the ligaments. It is graded by severity as follows:

- **First degree:** a tear of a minimum number of ligamentous fibers that results in localized tenderness without instability
- **Second degree:** a tear of a greater number of ligamentous fibers that results in a greater loss of function and joint reaction, but is still without instability
- **Third degree:** a complete tear of the ligament with resultant joint instability

The ligaments of the lower back act to interconnect the five vertebral bones and provide support or stability for the low back. A sprain of the low back can occur when a sudden, forceful movement injures a ligament which has become stiff or weak through poor conditioning or overuse.

Mechanical or Discogenic Lumbar Pain: 85% of back pain is caused from sprains, strains and inflammation. This pain results from inflammation caused by irritation or injury to: the discs, facet joints, ligaments or muscles of the back. A common cause of mechanical pain is disc degeneration. The intervertebral discs serve as a shock absorber, load distributor and spacer. As each disc is placed under constant pressure during spinal flexion and extension, the discs absorb the stress created by movement. With age and motion, some disc wear and tear will naturally occur. The disc will lose its ability to hold water, resulting in a lesser ability to absorb shock and a narrowing of the nerve openings in the sides of the spine, which will pinch the nerves. The result is increased disc stiffness. The degenerative changes within the disc are universal and account for one of the most common causes of chronic low back pain.

Discogenic Disc Disease: symptoms are characterized by local and radicular pain due to nerve root or spinal cord compression, caused by herniation of the nucleus pulposes.

The DeRoyal Prolign® Pro is designed to provide compression or cushioning of paravertebral soft tissues giving muscles and/or ligaments a chance to heal and/or rest, thus helping to reduce chronic low back pain. DeRoyal Prolign® Pro provides increased patient comfort and compliance by improving the abdominal compression through the use of the anterior plastic

insert, effortless application with instant full range adjustment, breathable material for better air circulation next to the body and increased comfort while maximizing support of the anatomical structures for the indication of use.

Basic Guidelines to Follow

- The Prolign® Pro orthosis should be worn with all daily activities, removing the brace up to 4X per day to perform trunk strengthening and flexibility exercises as instructed by a physician. (See suggested exercise program.)
- The Prolign® Pro orthosis should be worn continuously with activities of daily living, particularly with standing, bending and/or walking. The brace should also be worn while at work until these activities are pain free for at least one week.
- The Prolign® Pro orthosis should be applied in a standing position. **IMPORTANT NOTE:** The Prolign® Pro orthosis should be tightened in a supine position (lying on back) to maximize rib elevation, spinal decompression and lumbar stabilization. (See fitting and application instructions in Prolign® Pro packaging.)

Pain Control Achieved from Prolign® Pro

1. Restricted ROM into painful range
2. Increased truncal support that aids weak abdominal muscles and increases intra-abdominal pressure, thus mechanically unloading intervertebral discs
3. Improved posture by allowing a more balanced load distribution through the lumbar spine & pelvic region
4. Increased proprioception (contact with the skin) by helping to decrease motion into painful positions
5. Controlled swelling and edema by compression of paravertebral soft tissues
6. Reflexive muscle relaxation though body heat containment by the orthosis

Treatment Goals

1. Postural control
2. Proprioceptive feedback
3. Proper body ergonomics
4. Compression and cushioning
5. Warmth to soft tissue

LUMBAR STRESS TEST
Using Pain as a Guide!
Perform the following stress test if you have been **pain free** with daily activities, work-related stresses and your exercise program for at least 3 days. **Do Not** perform this test if your daily activities are still painful while wearing the Prolign® Pro orthosis.

TEST STEPS
1. Remove the orthosis.
2. Keeping the knees and elbows straight, bend forward at the waist.
3. While bending at the waist, very slowly slide your hands down the front of your thighs attempting to touch your toes.

** If you experience pain during this Lumbar Stress Test – **STOP.** Continuing to move into pain could cause further injury.**

- If the range of motion is limited by pain before the finger tips reach the mid-shin region, the patient should continue wearing the orthosis with daily activities, removing only for exercise and sleep unless otherwise instructed. The spinal connective tissue will require continued protection and additional time to heal.
- If the fingertips reach the mid-shin region or beyond before experiencing pain, you have regained 75%+ of the range of motion in the lumbar region and can begin weaning out of the brace. Use the guide below to rate or score the pain intensity and follow the appropriate treatment recommendations unless otherwise instructed.

INTENSITY OF PAIN – GUIDELINES
(subjective report at end range of lumbar flexion)
- If stress test of 5 repetitive forward bending motions, prolonged walking and standing, activities of daily living and exercise program are pain free, discontinue wearing the orthosis. Continue to wear the orthosis with strenuous activities for 7-10 days as needed.
- If the lumbar stress test is not pain free, see pain scale below and follow recommended wearing times.

Pain Scale/Guide to Follow When Weaning Patient Out of Prolign® Pro Orthosis

Guide should be adjusted appropriately for patient's age and diagnosis.

Pain Level 0: No Pain
- If pain free – repeat Lumbar Stress Test five times

Pain Level 1 - 3: Minimal Pain
- Apply orthosis after breakfast and dressing
- 4 hours on / 2 hours off (off time during non-strenuous activity)
- Retest daily – when pain free follow the no pain guidelines
- Continue to perform exercises within pain free range of motion as instructed by your physician
- Consider wearing the brace at night if sleep is frequently interrupted by pain

Pain Level 4 - 6: Moderate Pain
- Apply orthosis prior to dressing
- 6 hours on / 1 hour off
- Retest every 2 days – rate the pain and follow the appropriate guidelines
- Continue to perform exercises – pain free

Pain Level 7 - 9: Severe Pain
- Apply orthosis first thing out of bed in the morning
- Wear brace continuously throughout the day, removing only for exercises
- Repeat the lumbar stress test when daily activities are pain free and follow the appropriate guidelines based on rate of pain

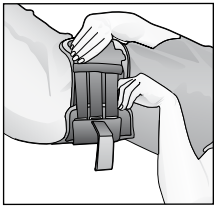
Pain Level 10: Emergency Room
- Contact your physician immediately
- Physician follow up

***** Remember in addition to the Lumbar Stress Test, you must be pain free with activities of daily living, prolonged walking and standing and exercise program before discontinuing the use of the Prolign® Pro orthosis.**

FITTING/INSTRUCTIONS FOR USE

1. While in a standing postion, place Prolign® Pro orthosis so that the posterior plastic piece is centered in the low back area. Loosely secure side hook and loop closure attachments.

2. Lying in a supine position with the knees bent (flexed) and the hips parallel to the shoulders, adjust the side closure attachments making sure they are symmetrical to one another and are equal distance from the center.

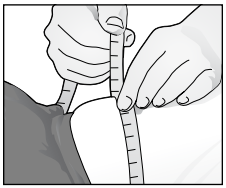


3. Once a comfortable level of compression is achieved, secure dynamic, stretch pull straps onto the front panel of the brace. This compression is totally adjustable and can easily be released or tightened depending on the level of activity.

**** The DeRoyal Prolign® Pro MUST be tightened while in a supine position** for the anterior and posterior plastic inserts to be fully effective and for the maximum level of compression to be achieved from the many features and benefits offered by the DeRoyal Prolign® Pro orthosis.

SIZING

Waist circumferential measurement

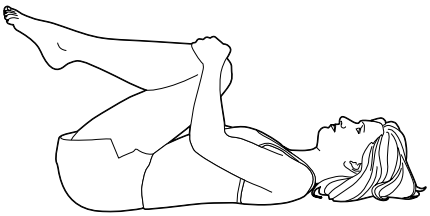


X-Small	25” - 30”
Small	30” - 35”
Medium	35” - 40”
Large	40” - 45”
X-Large	45” - 50”
XX-Large	50” - 55”

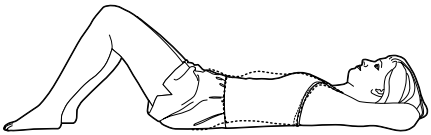
Suggested Lo-Intensity Lumbar Strengthening/Flexibility Exercise Program
With any injury or medical condition it is advisable to consult a physician or other medical professional before beginning any treatment or rehabilitation program.

Recommended Exercises (4X per day)

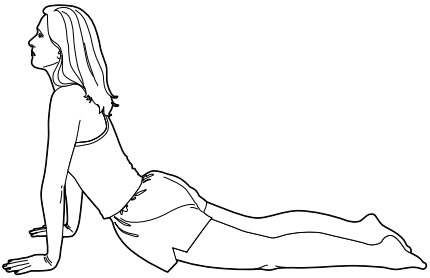
1. Double Knee to Chest Stretch
Pull both knees in to chest until a comfortable stretch is felt in lower back. Keep back relaxed.



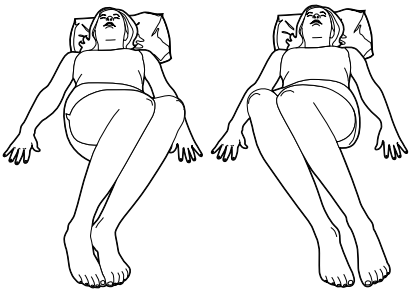
2. Pelvic Tilts
Slowly tilt pelvis forward for 5 seconds.



3. Prone Press-up
While keeping the pelvis and legs in contact with the floor, slowly push the torso off the floor and into extension using either the elbows or hands. Be sure to keep the buttocks and back relaxed, and keep the hips in contact with the floor. Hold when in a comfortable position for several seconds, then return to the starting position.

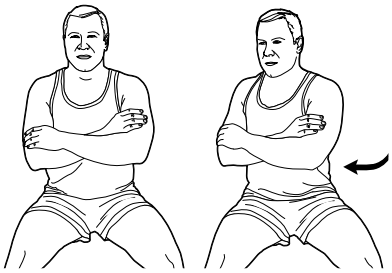


4. Lumbar Rotation in Non-Weightbearing
Slowly rock knees from side to side in a small, painfree range of motion. Allow low back to rotate slightly.



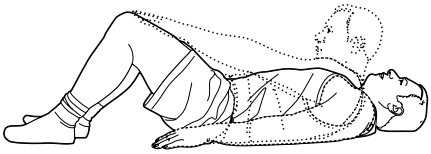
5. Seated Rotation Lumbar Stretching

Gently rotate trunk side to side in a small, pain-free range of motion.



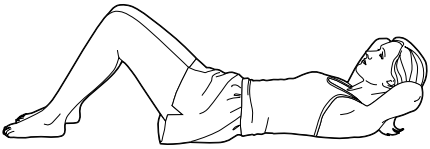
6. Curl-up I

With arms at sides, tilt pelvis to flatten back. Raise shoulders and head from floor. Use arms to support trunk if necessary.



7. Curl-up II

With hands supporting neck raise shoulders and head from floor. Stay in a pain-free range of motion.



Preventative Measures to Reduce Risk of Low Back Pain

The normal effects of aging that result in decreased bone mass, decreased strength and elasticity of muscles and ligaments can be slowed by:

1. Regular exercise to keep muscles of the lower back strong and flexible, preventing muscular fatigue.
2. Utilization of correct lifting and moving techniques.
3. Maintaining of proper body weight, as being overweight puts undue stress on back muscles.
4. Maintaining proper posture when sitting and standing.

DeRoyal®

Self Management Program

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Revision: 11/10
Reprint #0-1704

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