MATRIX


# THE MI BACK TRAINER
## EXERCISE PROTOCOLS

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# INTRODUCTION

Globally, we have seen an increase in reported lower back pain (LBP). Whether caused by inactivity or poor mechanics, the fact remains more and more people are experiencing lower back discomfort. While some have chronic severe pain, others wake up from weekend activities in acute pain. Regardless of the symptoms, back pain can be debilitating, dramatically diminishing quality of life and limiting daily activities.

The MI Back Trainer is a versatile training tool designed to isolate the muscles of the lower back and move with the user's normal pelvic rhythm. After research, ultrasound and comparable studies, three adjustable pad angles (55˚, 40˚, 25˚) were chosen to help users and therapists exercise lower back muscles in an efficient manner. Therapists can isolate muscles of the lower back and pelvis in patient treatment programs while mitigating damage to the supportive structures of the spine. Research shows that these angles not only work the deep lumbar spine stabilizers, but effectively eliminate stress to the tissues around the lower back and pelvis. By moving with the user's normal pelvic rhythm, the MI Back Trainer assists with proper alignment and good stability while exercising back muscles.

## MOTIONS

The MI Back Trainer lets users train in a straight plane, diagonally and on each side. When performing side motions, research showed the second angle (40˚) to be most effective.

**Pad Angles:**

25˚

40˚

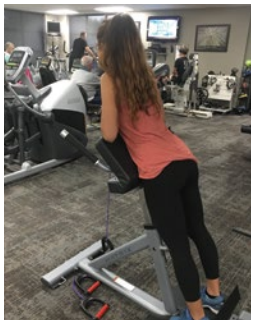
55˚

## PROPER PELVIC ALIGNMENT WHEN USING THE MI BACK TRAINER

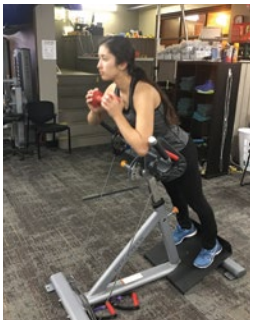
Patients do not usually know where their pelvis bends and mistakenly think it's where the hips bend. Educating proper pelvis rhythm assists in correct pad placement. This allows the pelvis to be the focal point for motion. Unlike traditional fitness machines, the pads were not designed to rest on the user's thighs. This illustration shows proper alignment while using the MI Back Trainer. It highlights the trunk pads aligning with the pelvis and not the thigh. This is proper alignment to start using the product.

## BANDS VS. WEIGHT RESISTANCE

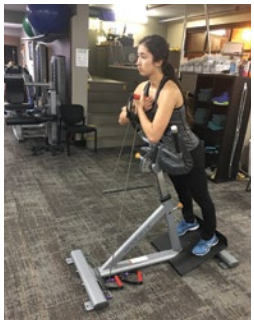
Bands provide variable resistance. The resistance can be changed (or tightened) based on how hard the user pulls up on them. Weights provide fixed resistance.



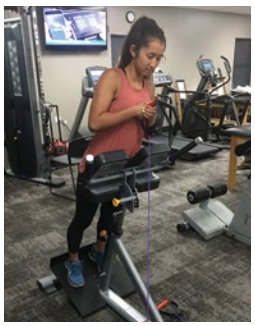
Start position with no weight



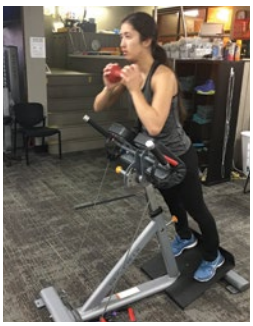
Start position with weights



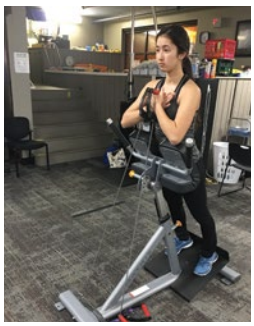
Start position with bands



End position with no weight



End position with weights



End position with bands

# NON-SURGICAL REHABILITATION

Users with lower back pain, hip pain or S-I dysfunction may experience discomfort that can be rehabilitated and alleviated with precise muscle activation. The MI Back Trainer offers a variety of pelvic angles and resistance to assist with rehabilitation goals.

## NON-SURGICAL LOWER-BACK PAIN PATIENTS

### WEEK 1

**BAND RESISTANCE TRAINING**

| ANGLE | RESISTANCE* | REPETITIONS |
|---|---|---|
| 25˚ | Light | 3 x 20 |
| 40˚ | Light | 3 x 20 |
| 55˚ | Light | 3 x 20 |

*Resistance is provided by bands connected to the hooks on the front of the machine.

**WEIGHT TRAINING**

| ANGLE | TIME | RESISTANCE | REPETITIONS |
|---|---|---|---|
| 25˚ | | No resistance | 5 x 12 |
| 40˚ | | No resistance | 5 x 12 |
| 55˚ | | No resistance | 5 x 12 |
| | | | |
| 25˚ | 15 second isometric hold | No resistance | |
| 40˚ | 15 second isometric hold | No resistance | |
| 55˚ | 15 second isometric hold | No resistance | |
| | | | |
| 25˚ | | 5 lbs. | 3 x 20 |
| 40˚ | | 5 lbs. | 3 x 20 |
| 55˚ | | 5 lbs. | 3 x 20 |
| | | | |
| 25˚ | | 10 lbs. | 3 x 20 |
| 40˚ | | 10 lbs. | 3 x 12 |
| 55˚ | | 10 lbs. | 3 x 12 |

## WEEK 2

| BAND RESISTANCE TRAINING | | |
|---|---|---|
| **ANGLE** | **RESISTANCE** | **REPETITIONS** |
| 25˚ | Light | 6 x 20 |
| 40˚ | Light | 6 x 20 |
| 55˚ | Light | 6 x 20 |
| | | |
| 25˚ | Medium | 3 x 10 |
| 40˚ | Medium | 3 x 10 |
| 55˚ | Medium | 3 x 10 |

| WEIGHT TRAINING | | | |
|---|---|---|---|
| **ANGLE** | **TIME** | **RESISTANCE** | **REPETITIONS** |
| 25˚ | | No resistance | 5 x 20 |
| 40˚ | | No resistance | 5 x 20 |
| 55˚ | | No resistance | 5 x 20 |
| | | | |
| 25˚ | 30 second isometric hold | No resistance | |
| 40˚ | 30 second isometric hold | No resistance | |
| 55˚ | 30 second isometric hold | No resistance | |
| | | | |
| 25˚ | | 5 lbs. | 5 x 20 |
| 40˚ | | 5 lbs. | 5 x 20 |
| 55˚ | | 5 lbs. | 5 x 20 |
| | | | |
| 25˚ | | 10 lbs. | 1 x 40 |
| 40˚ | | 10 lbs. | 1 x 40 |
| 55˚ | | No resistance | 1 x 50 |

## WEEK 3

| BAND RESISTANCE TRAINING | | |
|---|---|---|
| **ANGLE** | **RESISTANCE** | **REPETITIONS** |
| 25˚ | Medium | 6 x 20 |
| 40˚ | Medium | 6 x 20 |
| 55˚ | Medium | 6 x 20 |
| 40˚ | Heavy | 3 x 8 |

| WEIGHT TRAINING | | | |
|---|---|---|---|
| **ANGLE** | **TIME** | **RESISTANCE** | **REPETITIONS** |
| 25˚ | | No resistance | 3 x 30 |
| 40˚ | | No resistance | 3 x 30 |
| 55˚ | | No resistance | 3 x 30 |
| | | | |
| 25˚ | 45 second isometric hold | No resistance | |
| 40˚ | 45 second isometric hold | No resistance | |
| 55˚ | 45 second isometric hold | No resistance | |
| | | | |
| 25˚ | | 10 lbs. | 5 x 20 |
| 40˚ | | 10 lbs. | 5 x 20 |
| 55˚ | | 10 lbs. | 5 x 20 |
| | | | |
| 25˚ | | 12 lbs. | 1 x 40 |
| 40˚ | | 12 lbs. | 1 x 40 |
| 55˚ | | 12 lbs. | 1 x 40 |

## WEEK 4

| BAND RESISTANCE TRAINING | | |
|---|---|---|
| **ANGLE** | **RESISTANCE** | **REPETITIONS** |
| 25˚ | Light | 2 x 50 |
| 40˚ | Light | 2 x 50 |
| 55˚ | Light | 2 x 50 |
| | | |
| 25˚ | Heavy | 3 x 12 |
| 40˚ | Heavy | 3 x 12 |
| 55˚ | Heavy | 3 x 12 |

| WEIGHT TRAINING | | | |
|---|---|---|---|
| **ANGLE** | **TIME** | **RESISTANCE** | **REPETITIONS** |
| 25˚ | 60 second isometric hold | No resistance | |
| 40˚ | 60 second isometric hold | No resistance | |
| 55˚ | 60 second isometric hold | No resistance | |
| | | | |
| 25˚ | | 15 lbs. | 6 x 20 |
| 40˚ | | 15 lbs. | 6 x 20 |
| 55˚ | | 15 lbs. | 6 x 20 |
| | | | |
| 25˚ | | 12 lbs. | 3 x 20 |
| 40˚ | | 12 lbs. | 3 x 20 |
| 55˚ | | 12 lbs. | 3 x 20 |
| | | | |
| 25˚ | | 20 lbs. | 3 x 12 |
| 40˚ | | 20 lbs. | 3 x 12 |
| 55˚ | | 20 lbs. | 3 x 12 |

## CONSIDERATIONS:

- The repeated measure for reps and weights can be changed based on how well the patient is responding
- If the beginning phases are too easy, intensity can be increased
- Bands provide variable resistance, so it is best to start light to ensure the patient doesn't experience pain, especially the day after a workout
- Once the amount of muscle soreness and fatigue from a workout is determined, the patient can increase workload to gain the necessary strength in the deep lower back and help with stability

# POST-SURGICAL REHABILITATION

Therapists treating post-surgical patients can use the MI Back Trainer to create treatment protocols that afford the therapist the ability to increase the strength and endurance in the deep lumbar muscles during the rehabilitative process; thus, giving the spine more stability and better movement patterns.

## LAMINECTOMY PATIENTS

Below is a sample treatment plan for a patient recovering from a laminectomy procedure. Individual treatment protocols may vary.

### WEEK 1

| BAND RESISTANCE TRAINING | | |
|---|---|---|
| **ANGLE** | **RESISTANCE** | **REPETITIONS** |
| 25˚ | No resistance | 8 second isometric hold |
| 40˚ | No resistance | 8 second isometric hold |
| 55˚ | No resistance | 8 second isometric hold |

***Repeat 3 times***

### WEEK 2

| BAND RESISTANCE TRAINING | | |
|---|---|---|
| **ANGLE** | **RESISTANCE** | **REPETITIONS** |
| 25˚ | Light | 10 second isometric hold |
| 40˚ | Light | 10 second isometric hold |
| 55˚ | Light | 10 second isometric hold |

***Repeat 3 times***

| WEIGHT TRAINING | | |
|---|---|---|
| **ANGLE** | **RESISTANCE** | **REPETITIONS** |
| 25˚ | 2 lbs. | 3 x 10 |
| 40˚ | 2 lbs. | 3 x 10 |
| 55˚ | 2 lbs. | 3 x 10 |

## WEEK 3

| BAND RESISTANCE TRAINING | | |
|---|---|---|
| **ANGLE** | **RESISTANCE** | **REPETITIONS** |
| 25˚ | Light | 3 x 10 |
| 40˚ | Light | 3 x 10 |
| 55˚ | Light | 3 x 10 |

| WEIGHT TRAINING | | |
|---|---|---|
| **ANGLE** | **RESISTANCE** | **REPETITIONS** |
| 25˚ | 4 lbs. | 3 x 20 |
| 40˚ | 4 lbs. | 3 x 20 |
| 55˚ | 4 lbs. | 3 x 20 |
| | | |
| 25˚ | No resistance | 2 sets to fatigue |
| 40˚ | No resistance | 2 sets to fatigue |
| 55˚ | No resistance | 2 sets to fatigue |

## WEEK 4

| BAND RESISTANCE TRAINING | | |
|---|---|---|
| **ANGLE** | **RESISTANCE** | **REPETITIONS** |
| 25˚ | Light | 3 x 20 |
| 40˚ | Light | 3 x 20 |
| 55˚ | Light | 3 x 20 |

| WEIGHT TRAINING | | |
|---|---|---|
| **ANGLE** | **RESISTANCE** | **REPETITIONS** |
| 25˚ | 5 lbs. | 3 x 20 |
| 40˚ | 5 lbs. | 3 x 20 |
| 55˚ | 5 lbs. | 3 x 20 |
| | | |
| 25˚ | No resistance | 3 sets to fatigue |
| 40˚ | No resistance | 3 sets to fatigue |
| 55˚ | No resistance | 3 sets to fatigue |

## WEEK 5

| BAND RESISTANCE TRAINING | | |
|---|---|---|
| **ANGLE** | **RESISTANCE** | **REPETITIONS** |
| 25˚ | Light | 6 x 20 |
| 40˚ | Light | 6 x 20 |
| 55˚ | Light | 6 x 20 |

| WEIGHT TRAINING | | |
|---|---|---|
| **ANGLE** | **RESISTANCE** | **REPETITIONS** |
| 25˚ | 10 lbs. | 4 x 30 |
| 40˚ | 10 lbs. | 4 x 30 |
| 55˚ | 10 lbs. | 4 x 30 |
| | | |
| 25˚ | No resistance | 3 sets to fatigue |
| 40˚ | No resistance | 3 sets to fatigue |
| 55˚ | No resistance | 3 sets to fatigue |

CONSIDERATIONS:

- Isometrics are started with all angles but with no movement
- Forward motion and side flexion motion should be used each week
- Perform side flexion exercises at the second angle (40˚), move trunk to the right or left, bending from the waist
- Using diagonal functional crossing patterns engages the deep stabilizers of the spine. Patients should perform motions from perform motions from the bottom left to upper right, or bottom right to upper left
- Diagonals exercises should only be introduced after four weeks of rehabilitation
- Bands can be used for additional resistance

## SPINAL FUSION PATIENTS

Below is a sample treatment plan for a patient recovering from a spinal fusion procedure. Individual treatment protocols may vary.

### WEEK 1

| BAND RESISTANCE TRAINING | | |
|---|---|---|
| **ANGLE** | **RESISTANCE** | **REPETITIONS** |
| 25˚ | Light | 1 x 30 |
| 40˚ | Light | 1 x 30 |
| 55˚ | Light | 1 x 30 |
| **WEIGHT TRAINING** | | |
| **ANGLE** | **RESISTANCE** | **REPETITIONS** |
| 25˚ | 3 lbs. | 5 x 10 |
| 40˚ | 3 lbs. | 5 x 10 |
| 55˚ | 3 lbs. | 5 x 10 |
| | | |
| 25˚ | No resistance | 1 set to fatigue |
| 40˚ | No resistance | 1 set to fatigue |
| 55˚ | No resistance | 1 set to fatigue |

### WEEK 2

| BAND RESISTANCE TRAINING | | |
|---|---|---|
| **ANGLE** | **RESISTANCE** | **REPETITIONS** |
| 25˚ | Light | 3 x 20 |
| 40˚ | Light | 3 x 20 |
| 55˚ | Light | 3 x 20 |
| 25˚ | Medium | 5 x 10 |
| 40˚ | Medium | 5 x 10 |
| **WEIGHT TRAINING** | | |
| **ANGLE** | **RESISTANCE** | **REPETITIONS** |
| 25˚ | 3 lbs. | 5 x 20 |
| 40˚ | 3 lbs. | 5 x 20 |
| 55˚ | 3 lbs. | 5 x 20 |
| | | |
| 25˚ | No resistance | 2 sets to fatigue |
| 40˚ | No resistance | 2 sets to fatigue |
| 55˚ | No resistance | 2 sets to fatigue |

*Side flexion may be added on either side when working at 40˚ angle.

## WEEK 3

| BAND RESISTANCE TRAINING | | |
|---|---|---|
| **ANGLE** | **RESISTANCE** | **REPETITIONS** |
| 25˚ | Medium | 3 x 20 |
| 40˚ | Medium | 3 x 20 |
| 55˚ | Medium | 3 x 20 |
| | | |
| 25˚ | Heavy | 3 x 10 |
| 40˚ | Heavy | 3 x 10 |

| WEIGHT TRAINING | | |
|---|---|---|
| **ANGLE** | **RESISTANCE** | **REPETITIONS** |
| 25˚ | 5 lbs. | 5 x 20 |
| 40˚ | 5 lbs. | 5 x 20 |
| 55˚ | 5 lbs. | 5 x 20 |
| | | |
| 25˚ | 5 lbs. | 2 sets to fatigue |
| 40˚ | 5 lbs. | 2 sets to fatigue |
| 55˚ | 5 lbs. | 2 sets to fatigue |

## WEEK 4

| BAND RESISTANCE TRAINING | | |
|---|---|---|
| **ANGLE** | **RESISTANCE** | **REPETITIONS** |
| 25˚ | Medium | 1 x 50 |
| 40˚ | Medium | 1 x 50 |
| 55˚ | Medium | 1 x 50 |
| | | |
| 25˚ | Heavy | 3 x 20 |
| 40˚ | Heavy | 3 x 20 |

| WEIGHT TRAINING | | |
|---|---|---|
| **ANGLE** | **RESISTANCE** | **REPETITIONS** |
| 25˚ | 10 lbs. | 5 x 20 |
| 40˚ | 10 lbs. | 5 x 20 |
| 55˚ | 10 lbs. | 5 x 20 |
| | | |
| 25˚ | 7 lbs. | 2 sets to fatigue |
| 40˚ | 7 lbs. | 2 sets to fatigue |
| 55˚ | 7 lbs. | 2 sets to fatigue |

## WEEK 5

| BAND RESISTANCE TRAINING | | |
|---|---|---|
| **ANGLE** | **RESISTANCE** | **REPETITIONS** |
| 25˚ | Heavy | 2 x 30 |
| 40˚ | Heavy | 2 x 30 |
| 55˚ | Heavy | 2 x 30 |
| | | |
| 25˚ | Medium diagonals | 3 x 20 |
| 40˚ | Medium diagonals | 3 x 20 |

| WEIGHT TRAINING | | |
|---|---|---|
| **ANGLE** | **RESISTANCE** | **REPETITIONS** |
| 25˚ | 10 lbs. | 5 x 20 |
| 40˚ | 10 lbs. | 5 x 20 |
| 55˚ | 10 lbs. | 5 x 20 |
| | | |
| 25˚ | 10 lbs. | 3 sets to fatigue |
| 40˚ | 10 lbs. | 3 sets to fatigue |
| 55˚ | 10 lbs. | 3 sets to fatigue |

## CONSIDERATIONS:

- Fusion patients need help gaining stability of the spine, though typical patients do not start rehabilitation until three months after the fusion procedure
- Resistance can be added to provide progression and ensure patients continue feeling isolated muscle fatigue
- Fusion patients may start diagonal patterns three months after their surgical procedure.

# ADDITIONAL CONSIDERATIONS

Certain conditions need special consideration when including the MI Back Trainer in patient treatment protocols. When beginning a new treatment plan with a patient being seen for any of the below conditions, keep the following notes in mind:

## SPINAL STENOSIS

If the patient had surgery to decompress the index region, back muscles should be worked to a neutral position and not beyond. This is to ensure the patient can activate the muscles without closing the foremen where the nerves exist.

## FIBROMYALGIA

For fibromyalgia patients, use no weights and add light band resistance slowly.

## RHEUMATOID ARTHRITIS

For rheumatoid arthritis patients, use no weights for the first week of treatment, then slowly add weight.

## SPONDYLOLISTHESIS

This condition is a concern only if the patient is unstable. Only non-moving isometrics should be performed if instability exists. If a stable patient has a spondylolisthesis, then movements can be performed only to “neutral” position.

## SCOTT BENJAMIN, PT, DScPt, COMT
Creator & Co-Developer

Dr. Scott Benjamin, creator and co-developer of the MI Back Trainer, has been practicing Physical Therapy since 1989. As the owner of Exclusive Physical Therapy, a practice specializing in orthopedics, manual therapy, fall prevention, and aquatic therapy, Benjamin prides himself on helping clients to heal faster with innovative rehabilitation techniques. In addition to his role as a practicing Physical Therapist, Benjamin is the co-author of Cram Session in Functional Anatomy - a Handbook for Students and Clinicians, a published author of numerous scientific papers on therapeutic techniques for varying ailments, and is both a national and international educator on the topics of biomechanics of the spine, rehabilitation to the sacroiliac joint, and manual therapy and rehabilitation.