

PROFESSIONAL SERIES

# Reformer and Vertical Frame



Please review this important **instructions for use** for your new Merrithew® equipment and keep it handy for future reference.

# Target Groups and User Benefits

The applications of specific therapeutic and physical conditioning exercises possible on Merrithew Pilates equipment span a wide variety of situations. Patient target groups would include any individual receiving an exercise prescription for the rehabilitation of an injury, management of a chronic condition or those looking to prevent re-injury, slow or halt the progression of a specified condition. Indications would include rehabilitative and post-rehabilitative management of musculoskeletal conditions including injuries to soft tissues including muscle, tendon, ligament, joint capsules, etc., neurological disorders like Acute Spinal Cord Injury, Alzheimer's Disease, Amyotrophic Lateral Sclerosis (ALS), recovery from surgery for any reason, or a multitude of other physical issues. There are very few contraindications to working on the Merrithew Pilates equipment as prescribed exercises can be modified to suit any type of limitation or movement impairment.

The benefits expected can include strengthening of stabilizing and mobilizing musculature, re-establishment of desired joint movement patterns and range of motion, greater somatic and sensory awareness and improved postural stability with a decrease in overuse or faulty patterns. Specific benefits would align directly with the exercise and movement prescription and would be specific to the individual.

## Exercise Essences

Each STOTT PILATES exercise has a specific goal. The essential elements of each exercise are listed and described below. In most exercises more than one element is involved, but more emphasis may be placed on some than others. Keep the essence of each exercise in mind so that modifications can be made while still working toward that goal.

**TARGET MUSCLES:** muscles targeted to be strengthened, which can be either stabilizers or mobilizers. This does not include all the muscles that may possibly be working in a given movement or exercise, just those upon which emphasis should be placed.

**STABILITY:** keeping one part of the body still or relatively still while another moves; requires control and constancy of muscular contraction. Also note that in the exercises attention is paid to stabilizing the spine during movement, whether flexing, extending, rotating or laterally flexing. The role of the transversus abdominis and the deep segmental spinal muscles (including multifidus) in stabilizing the lumbar spine is key.

**MOBILITY:** emphasizes movement at a joint or series of joints such as the spine.

**SEQUENCING:** the order in which movements happen within an exercise; for instance, which joint moves first, which moves second, and where the movement initiates from. This is particularly important when talking about spinal movement (whether the movement initiates from the top or bottom of the spine).

**ENDURANCE:** recruiting the same muscle group over a sustained period of time.

**BALANCE:** challenging balance by narrowing the base of support.

**COORDINATION:** challenging coordination with more movements happening simultaneously or with a more complex sequence of movements.

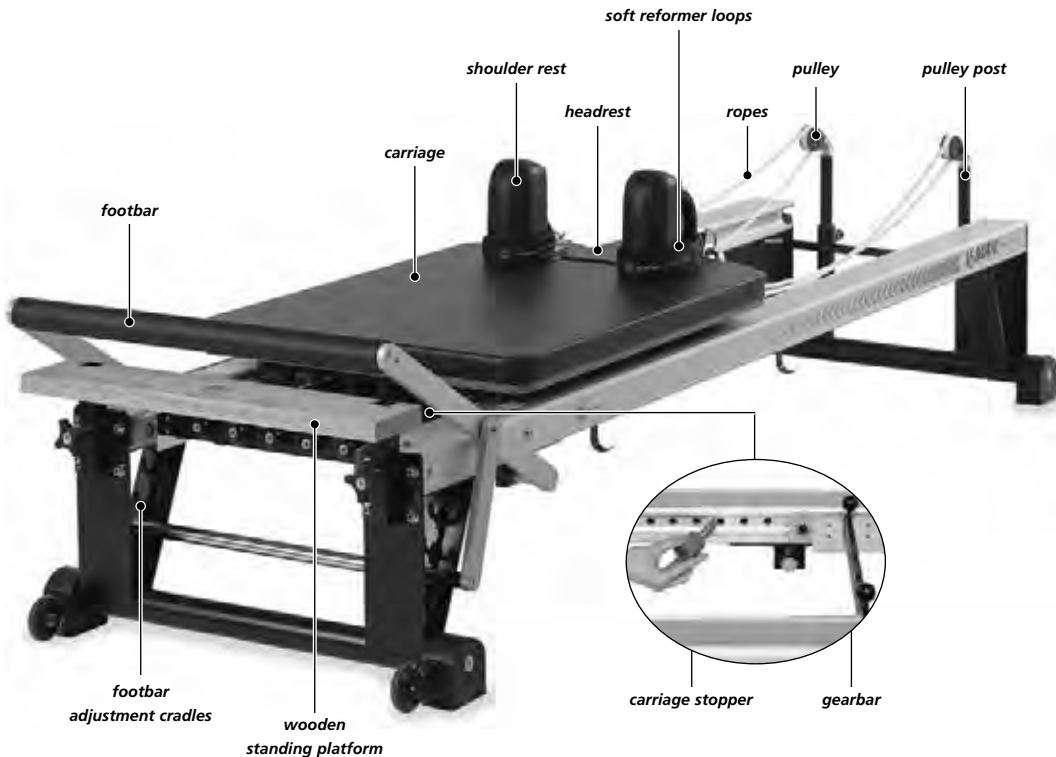
## Biomechanical Principles

The STOTT PILATES® method incorporates modern theories of exercise science and spinal rehabilitation through the Biomechanical Principles. As the basis of the exercises in the technique, these principles are related to body awareness and proper alignment. Rather than being separate entities, the six principles – Breathing, Pelvic Placement, Rib Cage Placement, Scapular Movement & Stabilization, Head & Cervical Placement, and Hip, Knee Ankle & Foot Alignment – work together to create Intelligent Exercise that is both safe and effective.

Teaching clients the Principles at an early stage in their program ensures that they will become aware of how the body moves and functions. This helps enhance skill level and mindfulness, and ensure focus and control, allowing them to reap the full benefits of this method.

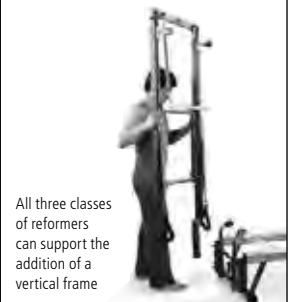
# Anatomy of a Reformer

The illustration below is of a typical Merrithew® Reformer. While there are differences to each model, the basic makeup is the same. Parts identified here correspond with this manual. For additional part names and details on specific models, see the corresponding Owner's Manual.



## THREE REFORMER TYPES

The three classes of Merrithew Reformers – V2 Max™, Rehab and SPX® – differ mostly in the height of the leg.



## IMPORTANT

This section contains important safety and usage information. Please read carefully before using your Merrithew Reformer.

**UNSAFE OR IMPROPER USE OF THIS EQUIPMENT BY FAILING TO READ AND COMPLY WITH ALL REQUIREMENTS AND WARNINGS COULD RESULT IN SERIOUS INJURY.**

It is impossible to predict every situation and condition that can occur while using your Reformer. Merrithew makes no representation about the safe use of the Reformer under all conditions. There are risks associated with the use of any exercise equipment which cannot be predicted or avoided, and you assume the responsibility for that risk.

Merrithew recommends cautious assembly and usage and wishes you many hours of safe and effective exercise.

**ANY SERIOUS INCIDENT OCCURRING IN RELATION TO THE EQUIPMENT SHOULD BE REPORTED TO MERRITHEW AND THE COMPETENT AUTHORITY OF THE USERS' MEMBER STATE.**

## USER'S GUIDELINES

The Merrithew Reformer is a sophisticated piece of Pilates equipment that, when used properly, can facilitate many exercises safely and effectively; however, care and caution must be taken as there are some inherent dangers when using any exercise equipment – especially when spring resistance is involved.

**FOR INEXPERIENCED OR FIRST-TIME USERS, THE MERRITHEW REFORMER SHOULD ONLY BE USED UNDER THE SUPERVISION OF A TRAINED PROFESSIONAL.**

## CAUTION

Replace all springs every 24 months and spring clips every 12 months, or as needed within that period.

**FAILURE TO PERFORM RECOMMENDED SAFETY CHECKS, OR USING EQUIPMENT WITH IMPROPERLY ADJUSTED, BROKEN OR WORN PARTS, COULD RESULT IN SERIOUS BODILY INJURY.**

# Safety & Usage

## MECHANICAL SAFETY CHECK

Proper maintenance and timely replacement of your equipment or component parts is your responsibility.

Conduct a regular weekly inspection of the following:

- ▶ Ensure footbar is securely fastened.
- ▶ Ensure swing arm support is securely fastened.
- ▶ Ensure all nylon locknuts and spring bolts are securely fastened.
- ▶ Check wear on all star knob threads, replace as needed.
- ▶ Check wear on ropes, replace as needed.
- ▶ Ensure shoulder rests are inserted completely.
- ▶ Check that spring nuts, spring bolts and ball ends of springs are securely fastened.
- ▶ Check wear on single and double-ended spring clips and replace every 12 months or as needed.
- ▶ Check for deformation of springs and replace every 24 months or as needed.

Failure to perform recommended safety checks, or using the machine with improperly adjusted, broken or worn parts could result in serious bodily injury.

## CARE AND CLEANING

We recommend wiping vinyl surfaces using warm water with mild soap, and clear water rinses for day-to-day cleaning. Ensure soap does not leave an oily residue, or make surfaces slippery. We do not recommend using chemical-based products.

The inside of the aluminum rails and rollers should be cleaned weekly with window cleaner and a cloth. Spray cleaner onto cloth first, avoid spraying directly onto surfaces, rollers or aluminum rails.

**CAUTION:** Never use oil lubricants as they may damage rollers.

## REFORMER SETTINGS

### CARRIAGE STOPPER

The carriage stopper position determines how close the carriage slides in toward the wooden standing platform and dictates the range of motion required of the body's joints. The hole closest to the wooden standing platform is referred to as position #1; the next hole is position #2, etc.

### ADJUSTING THE CARRIAGE STOPPER

- ▶ Do not sit on carriage while adjusting.
- ▶ Remove all springs from gearbar.
- ▶ Insert carriage stopper in one of six positions.
- ▶ Be sure carriage stopper is completely inserted in the hole and is not loose.

The carriage stopper position is usually selected so that when lying supine (on your back), with heels on the footbar, there is a 90° angle of flexion at the hip joint when the carriage is against the carriage stopper. If injury, disease or other limitations restrict flexion at the hips or knees, adjust the carriage stopper by placing it farther out. Adjustments can also be made for the exercise being performed.

**NOTE:** The carriage stopper must be inserted in one of the six positions AT ALL TIMES. Using the Reformer without the carriage stopper may cause damage to the gearbar block, rollers and/or molded spring holder.

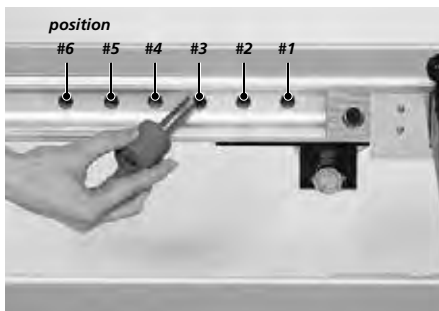
### SPRINGS

The number of springs attached to the gearbar determines the total amount of resistance. Most Merrithew Reformers are equipped with one 50% tension and four 100% tension springs. Also available are 25% and 125% tension springs.

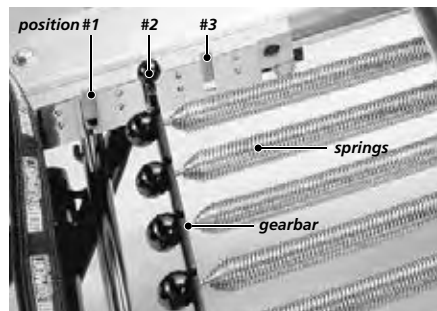
### ADJUSTING SPRINGS

- ▶ Take care when attaching and detaching springs.
- ▶ For safety, place one hand on gearbar.
- ▶ Firmly grasp spring, (not the ball on the spring), and stretch it to hook to or unhook from gearbar.
- ▶ Ensure ball end of spring rests securely in concave indentations of gearbar.

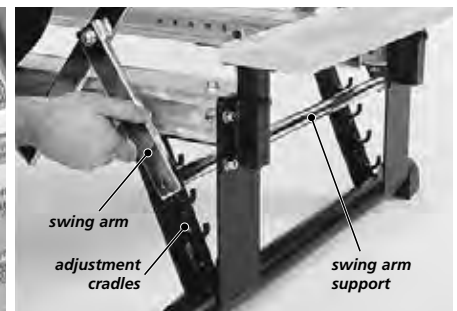
## Reformer Features



carriage stopper



springs and gearbar



adjusting the footbar

## GEARBAR

The gearbar setting determines the amount of initial tension on the springs. The position closest to the wooden standing platform is position #1; the next is position #2; etc. Lower position numbers provide higher spring tension.

### ADJUSTING THE GEARBAR

- ▶ Do not sit on carriage while adjusting.
- ▶ Remove all springs from gearbar.

### TRADITIONAL

- ▶ Lift gearbar and place into desired position.
- ▶ Ensure gearbar slides fully into slots.
- ▶ Ensure concave indentations face toward the wooden standing platform.

### HIGH-PRECISION

- ▶ Pull out the two spring-loaded pins.
- ▶ Slide the entire mechanism forward or back to desired position.
- ▶ Release the pins and lock the gearbar in place.
- ▶ Ensure the pins have reset fully into the slots.

## FOOTBAR

The footbar can be set at four different heights to facilitate various Reformer exercises and to accommodate physical differences and abilities. The top placement is position #1, the lowest is position #4.

### ADJUSTING THE FOOTBAR

- ▶ The footbar can be adjusted while standing beside the Reformer or sitting on the carriage.
- ▶ Gently pull footbar up and lift swing arm support out of footbar adjustment cradle.
- ▶ Lift or lower footbar to the desired height and place swing arm support securely into nearest footbar adjustment cradle.

## ROPES

To determine correct length of ropes, set carriage stopper in second hole, engage springs so carriage does not move, then attach Reformer loops to ropes and place loops on carriage so fixed D-ring on loop lines up with metal plate of shoulder rest.

## PULLEYS

We recommend adjusting the height of the pulleys to the same height as the top of the shoulder rests.

### ADJUSTING THE QUICK-SET PULLEY POSTS

- ▶ Pull out spring-loaded pin and adjust pulley posts to desired height.
- ▶ Release the pin and lock the pulley post in place.
- ▶ Ensure the pin has reset fully into the slot.

### REMOVING THE PULLEY POSTS

- ▶ Loosen star knobs or pull out spring-loaded pins (where applicable) and remove pulley posts from receptacles.

## SHOULDER RESTS

Shoulder rests are removable to allow storage of the Reformer and to facilitate the use of a mat converter.

### INSERTING THE SHOULDER RESTS

- ▶ Slide square posts into receptacles in the carriage. Face padded side toward footbar and handles toward outside of carriage.
- ▶ To remove, pull directly up on handles.

## HEADREST

The headrest adjusts to three positions: flat, half-raised or fully raised. It should be adjusted on an individual basis to ensure neck and shoulders are comfortable and tension-free when lying supine.

In exercises where the hips are lifted higher than the shoulders, headrest should be flat – even when beginning from a supine position. In some exercises it is raised to provide a brace for the feet.

### ADJUSTING THE HEADREST

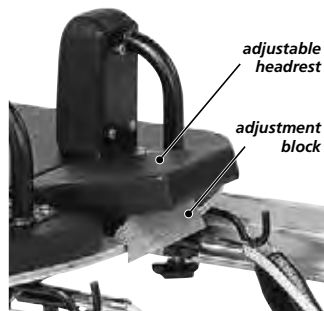
- ▶ With no weight on headrest, lift it and hinge adjustment block to rest securely onto wooden edge of carriage.



*high-precision gearbar*



*detachable shoulder rests*



*adjustable headrest*



*adjusting length of ropes*

# Safety & Usage continued

## GETTING ON THE REFORMER

**STOP!** Before getting on the Reformer, ensure that at least one spring is securely attached to the gearbar!

### SUPINE POSITION

Sit on Reformer carriage, legs off to one side. Reach hand nearest the footbar across the body and place it onto the shoulder rest. Tuck opposite shoulder under arm and roll onto back lowering head onto headrest. Bring legs up and place feet on footbar lowering arms by side.

### SITTING OR LYING ON A BOX

Always place Reformer box in a stable position on the Reformer and put weight directly in the middle to avoid tipping. When using footstrap, ensure it is underneath the wooden standing platform and securely clipped together.

### SECURE HANDS AND FEET

Whenever placing hands or feet on the footbar, shoulder rests or headrest, ensure they will not slip during exercise. Gripper mats may be used.

### STANDING OR KNEELING POSITIONS

The carriage is a moving platform. Special attention must always be paid to maintaining balance and stability, especially when performing kneeling or standing exercises.

Before beginning, ensure that one or more springs are engaged in the gearbar to secure the carriage. Step carefully onto the wooden standing platform – a gripper mat may be used to prevent slipping. Place other foot carefully onto the carriage. When standing on the carriage with two feet, it is advisable to have a spotter to steady the carriage.

**NOTE:** The method for mounting the SPX Reformers differs from that of other Merrithew Reformers. See caution below.

## MOVING THE REFORMER

All Reformers have easy-roll wheels to facilitate moving or repositioning. Two people may be required to move a Reformer with a vertical frame safely due to its weight and size.

### PREPARING TO MOVE THE REFORMER

- Ensure ropes do not drag and springs are attached so carriage is secure.
- Stand at the pulley post end of Reformer, grasp the horizontal metal bar, and gently lift. Lift Reformer high enough to engage easy-roll wheels.

## STACKING & STORING SPX MAX REFORMERS

You can stack five SPX Max Reformers on the optional rolling base or a maximum of six on a level floor without the rolling base.

### PREPARING FOR STACKING OR STORING

- Lower footbar, insert carriage stopper into third position and engage two springs.
- Remove shoulder rests and insert into receptacles under frame.
- Remove pulley posts without disengaging ropes and secure in receptacles under frame.

### STACKING THE REFORMER

- Stacking requires two people. The stronger person should take the heavier footbar end.
- Hold the steel plate beneath the wooden standing platform. Do not lift by wooden platform alone.
- Lift the pulley post end by gripping horizontal metal bar.

**CAUTION:** Be sure not to stack Reformers higher than your height comfortably allows lifting them.



## CAUTION

**IMPROPER USE OF EXERCISE EQUIPMENT MAY CAUSE SERIOUS BODILY INJURY. TO REDUCE RISK, PLEASE READ THE FOLLOWING:**

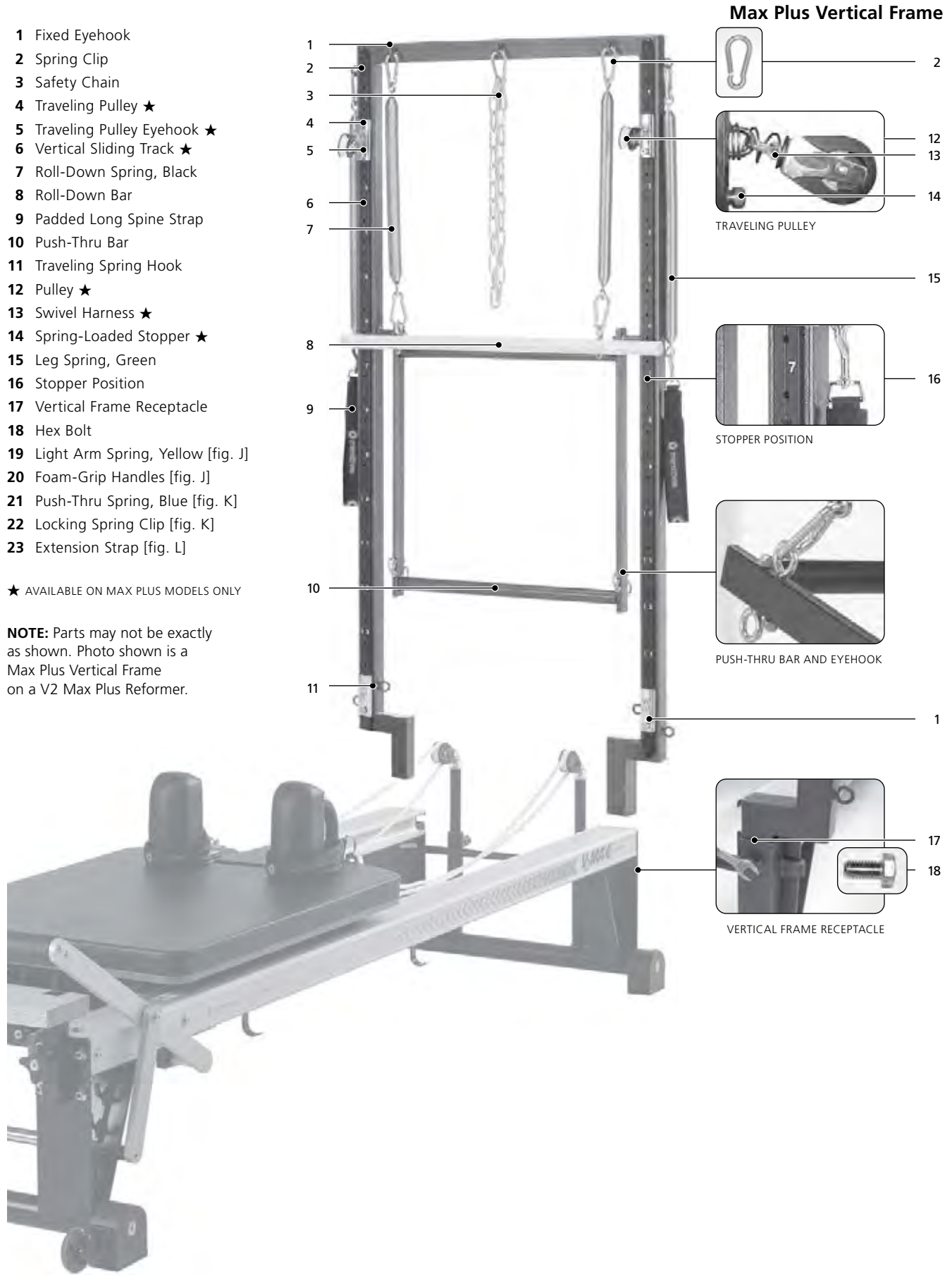
- Before starting any exercise program, consult a physician.
- This equipment is intended for indoor use and Pilates exercises only.
- The Reformer should be used under the supervision of a trained professional.
- NEVER stand with both feet on wooden standing platform of an SPX Reformer. Step onto secured carriage first before placing one foot onto wooden standing platform. Always keep one foot on secured carriage.
- Before moving a Merrithew Reformer, ensure ropes do not drag and springs are attached so carriage is secure.
- Ensure equipment is properly adjusted for your size and ability.
- The SPX Max, V2 Max and Rehab V2 Max Reformers should be used by only one person at a time, not weighing over 350 lbs / 159 kgs.
- This equipment must be installed on a level and steady floor.
- Before using this Reformer, ensure that the carriage stopper is fully inserted and at least one spring is securely attached to the gearbar.
- Stop exercising immediately if you experience chest pain, feel faint, have difficulty breathing or experience musculoskeletal discomfort.
- Keep body, clothing and hair free from all moving parts.
- Do not use if equipment appears worn, broken or damaged.
- Do not attempt to repair equipment yourself without consulting Merrithew.
- Do not allow children to use or be around equipment without adult supervision.
- For optimal performance, allow at least two feet of clear space on either side of a Merrithew Reformer.

# The Vertical Frame

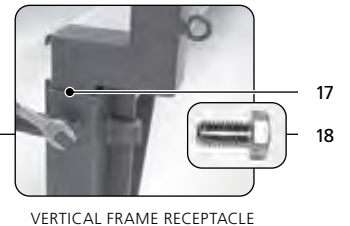
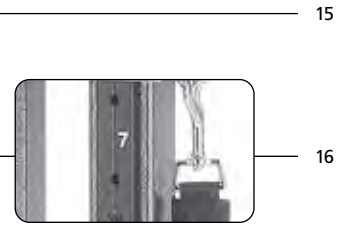
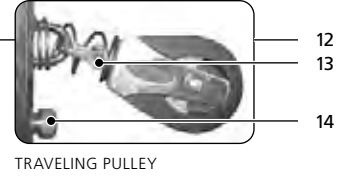
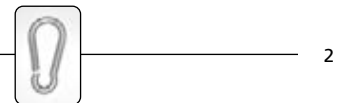
- 1 Fixed Eyehook
- 2 Spring Clip
- 3 Safety Chain
- 4 Traveling Pulley ★
- 5 Traveling Pulley Eyehook ★
- 6 Vertical Sliding Track ★
- 7 Roll-Down Spring, Black
- 8 Roll-Down Bar
- 9 Padded Long Spine Strap
- 10 Push-Thru Bar
- 11 Traveling Spring Hook
- 12 Pulley ★
- 13 Swivel Harness ★
- 14 Spring-Loaded Stopper ★
- 15 Leg Spring, Green
- 16 Stopper Position
- 17 Vertical Frame Receptacle
- 18 Hex Bolt
- 19 Light Arm Spring, Yellow [fig. J]
- 20 Foam-Grip Handles [fig. J]
- 21 Push-Thru Spring, Blue [fig. K]
- 22 Locking Spring Clip [fig. K]
- 23 Extension Strap [fig. L]

★ AVAILABLE ON MAX PLUS MODELS ONLY

**NOTE:** Parts may not be exactly as shown. Photo shown is a Max Plus Vertical Frame on a V2 Max Plus Reformer.

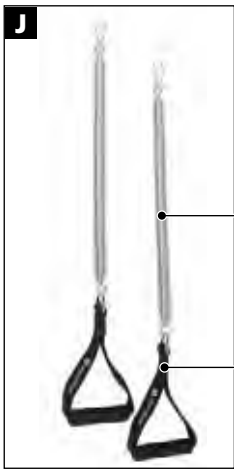


## Max Plus Vertical Frame

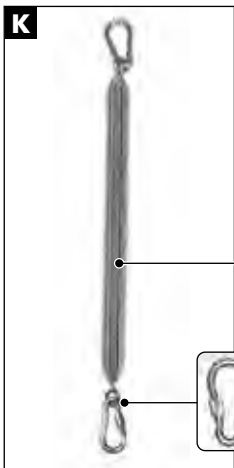


# The Vertical Frame continued

Traditional Vertical Frame



LIGHT ARM SPRING WITH FOAM-GRIP HANDLE



PUSH-THRU SPRING WITH LOCKING SPRING CLIP



EXTENSION STRAPS



## Specifications

SPRING TYPE	MAXIMUM STRETCH (in)*	MAXIMUM FORCE (lbf)	MAXIMUM STRETCH (cm)*	MAXIMUM FORCE (Nm)
25% (white)	95"	26 lbf	241.3 cm	35.25 Nm
50% (blue)	74"	36 lbf	187.9 cm	48.81 Nm
100% (red)	58"	53 lbf	147.3 cm	71.86 Nm
125% (black)	57"	59 lbf	144.8 cm	79.99 Nm

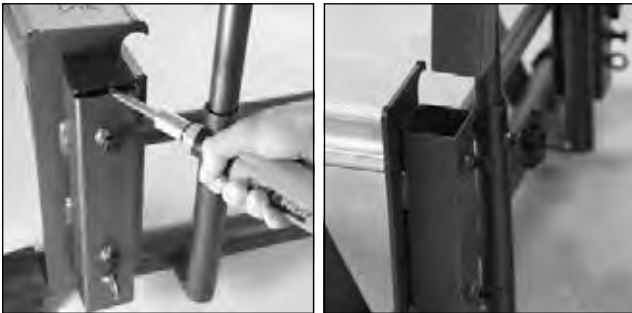
REFORMER TYPE	WEIGHT	SURFACE AREA
SPX Max Reformer	128 lbs / 58 kg	17.85 sq ft / 1.66 sq m.
V2 Max Reformer	145 lbs / 65.8 kg	20.21 sq ft / 1.88 sq m.
Rehab Reformer	185 lbs / 83.9 kg	20.21 sq ft / 1.88 sq m.

\* end-to-end



# Installing the Vertical Frame

Consult our online assembly video at [merrithew.com/eq-assembly](http://merrithew.com/eq-assembly)



**1.** Remove the receptacle covers and slide vertical frame into receptacles. For Max Plus models, position pulley system facing carriage. For traditional models, position highest eyehooks facing carriage. Tighten all four hex bolts. Attach springs, roll-down bar and safety chain as illustrated. See page 7 [fig. Traditional vertical frame].

**CAUTION:** We strongly advise that two people perform this step to ensure the frame bars are level and fit evenly and securely into the receptacle to allow for proper alignment.



**2. MAX PLUS FRAMES:** To use traveling pulleys extend ropes and detach double-ended swivel spring clips and Soft Reformer Loops. Pinch end loop of ropes and insert through the bottom of traveling pulleys. Reattach double-ended spring clips and Soft Reformer Loops and reset rope to desired length.



**3.** To alter the height of traveling pulleys, pull out spring-loaded stoppers. Shift the traveling pulleys up or down vertical sliding tracks and release spring-loaded stoppers. Shake pulleys to confirm they are fully locked into stopper positions.



**4.** For exercises using arm or leg springs, attach springs to traveling spring hooks, and adjust height in the same way as traveling pulleys. After changing position, shake spring hooks to confirm they are fully locked into stopper positions.

# Removing the Vertical Frame



Remove all springs from vertical frame, including roll-down bar and safety chain. Loosen all four hex bolts at the base of receptacles. Secure push-thru bar in place by hand while removing vertical frame.

**NOTE:** Requires two people.

# Setting Up the Vertical Frame

**CAUTION:** Ensure spring clips are **fully closed at both ends** of springs. A spring clip that is only partly closed risks detaching with high force

## Push-Thru Bar, Springs from Below



**CAUTION: THE SAFETY CHAIN MUST BE ATTACHED WHEN USING THE PUSH-THRU BAR WITH SPRINGS FROM BELOW.**

When using the push-thru bar with springs from below, attach springs to eyehooks on lowest eyehooks on vertical frame using locking spring clips. Then attach one or two springs to eyehooks on lower side of bar, ensuring spring clips are completely closed and secure.

**A TRAINED PROFESSIONAL MUST KEEP A HAND ON THE BAR AT ALL TIMES AND SAFETY CHAIN MUST BE USED.**

## Push-Thru Bar, Springs from Above



**CAUTION:** To prevent accidental injury, never put your face (or another body part) above the push-thru or roll-down bar while spotting an exercise.

When performing exercises that require the spring resistance to come from above the bar, attach the push-thru spring to the eyehook on the upper side of the push-thru bar with the locking spring clip. Attach the other end of the push-thru spring with the spring clip to one of the eyehooks on the vertical frame.

A trained professional must keep a hand on the push-thru bar for any exercises with the springs attached from above. Locking spring clips must be used to attach push-thru springs from below to the vertical frame.

## Adjustable Pulley System



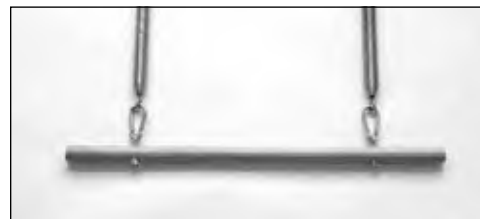
**MAX PLUS ONLY:** The spring-loaded track system provides adjustability for pulleys and spring hooks throughout the range of the vertical frame.

### Altering Height of Traveling Pulleys and Traveling Spring Hooks

- ▶ Pull out the spring-loaded stopper on traveling pulley.
- ▶ Shift traveling pulley up or down the track and release the spring-loaded stopper. The pulley will spring-lock into the nearest stopper position.
- ▶ Shake traveling pulley to confirm it is fully locked into stopper position.
- ▶ The same method applies to adjusting traveling spring hooks.
- ▶ Adjust rope length as necessary

**CAUTION:** Prior to use, confirm that the traveling pulley system is in good order and that the threaded bolts or the traveling pulleys are securely fastened.

## Roll-Down Bar



Attach roll-down springs to roll-down bar, then to the fixed eyehooks at the top of the vertical frame (see page 7). Both springs must be attached. To decrease or increase, spring tension, substitute light arm springs or leg springs respectively. Make sure spring clips are completely closed and secure.

**CAUTION:** Roll-down bar can release at high velocity due to spring tension. Ensure a secure grip at ALL times. Gripper mats are recommended.

# Exercise Starting Positions

It is important to start each exercise in a position as tension-free as possible. If there is already tension before starting, too much stress will be created once movement begins.

However, this does not mean complete relaxation. For example, when supine and maintaining neutral placement throughout the torso (a common starting position), it will be necessary to utilize muscular activation to maintain pelvic, rib cage and spinal placement. After learning the STOTT PILATES Biomechanical Principles, a client will be on the way to achieving a tension-free position.

In every exercise a stable starting position is essential; and stabilization is required regardless of the placement of the torso, whether supine, prone, sitting or side-lying. Several elements are common to this ideal positioning. With many clients, modifications to the starting position may be necessary to alleviate tension.

## SUPINE

When starting supine with the torso in a neutral alignment, the arms are often resting at the sides of the body. In this position, the scapulae, arms and gleno-humeral joint should be in a neutral position in relation to each other and the upper torso.

If the scapulae cannot be prevented from protracting with palms facing down, then turn the palms to face the body instead.

When supine, a client with a forward head posture may demonstrate tension in the neck and overextension in the cervical spine. Place a rubber pad or foam cushion of the appropriate height under the head to position the cervical spine neutrally. This may also be necessary if a kyphosis is present.

In situations where neck tension results due to weakness in the cervical flexors, an exercise that requires flexing the upper torso from a supine position with the arms by the sides of the body (for instance, Ab Prep) may result in neck strain. Placing one or two hands behind the head may offer additional support for the weight of the head and the altered scapula position may alleviate tension in the cervical spine. It will also increase the challenge to the abdominals by shifting the weight distribution toward the upper torso.

## LEGS TABLETOP OR DIAGONAL

The tabletop position of the legs refers to a starting position in which the body is supine, with the knees and hips flexed to 90° so that the lower legs are parallel with the mat. The angle at the hip joints may be decreased from 90° to decrease the load and help maintain stability and conversely, may be increased to make stabilization more challenging. This will be true whether working in a neutral or imprinted position.

The legs often begin reaching on the diagonal when lying supine. However, it is important they reach only as low as the spine and pelvis can be stabilized, abdominal engagement can be maintained, and there is no tension created through the upper body and lumbar spine.

Exercises with legs tabletop or on a diagonal can be performed in an imprinted or neutral alignment. In either case, lumbo-pelvic stability and engagement through the abdominals must be maintained.

## SITTING

When sitting vertically, the cervical spine should have its natural curve, slightly convex anteriorly, and the head should balance directly above the shoulders. A forward head posture occurs when in a sitting position the head rests forward of the shoulders and the neck is overextended. A more neutral alignment should be encouraged.

In many cases, a vertical pelvis may not be achieved when sitting with legs straight. In this case, sitting with legs slightly bent or tailor-crossed, raising the pelvis by sitting on a prop such as a foam cushion, padded platform extender, or box may bring the pelvis and spine into a more optimal alignment.

## PRONE

Depending on musculoskeletal alignment and imbalances, some individuals may be better able to find a stable position when prone with the legs slightly abducted (hip-distance apart) in exercises that call for legs completely adducted.

Using a prop such as a rubber pad or arc barrel under the pelvis may alleviate tightness or discomfort and allow for greater stabilization.

## LEG ALIGNMENT

Props like rubber pads, balls, foam cushions or sponges can be used as spacers between the legs to encourage proper alignment. This can help activate the adductors even when legs are not completely touching. Similarly, props around the outside of the legs can assist in activating abductors.

When working hip extensors, lateral rotation at the hip tends to recruit more fibers of gluteus maximus and hamstrings. Medial rotation tends to recruit more medial hamstrings. Similarly, when working hip flexors, lateral rotation at the hip recruits iliopsoas more. A parallel position recruits rectus femoris more. Medial rotation tends to recruit tensor fascia lata more. There are many exercises where a choice can be made to use one or the other in order to target specific muscles.

It is important to remember the value of working in a parallel position to work the muscles in a balanced way around the hip joint.

However, when moving into lumbar extension, it is always necessary to use an abducted and laterally rotated position to facilitate movement of the pelvis on the femur to prevent excessive extension of the lumbar spine.

## MODIFICATIONS

In all cases, adjustments to starting positions should be made to ensure that all facets including optimal alignment, tension reduction, movement patterning, muscle activation sequencing, as well as all elements of the exercise essence are performed effectively.

# Footwork

**STARTING POSITION** ALL FOOTWORK EXERCISES  
Supine, pelvis and spine neutral. Arms long by sides of body, palms down.

## 1. TOES APART HEELS TOGETHER

*footbar position #1, 3 or 4 springs, headrest adjusted for individual*

### STARTING POSITION

Balls of feet on footbar, toes apart, heels together. Legs laterally rotated, knees flexed just wider than shoulder-distance apart. Knees pointing over center of feet.

### EXERCISE

*To prepare, inhale...*

**EXHALE** squeeze heels together and extend knees to push carriage out.

**INHALE** flex knees and hips, controlling return of carriage.

*Complete 10–12 repetitions.*

### FOCUS

- ▶ all those listed on page 15
- ▶ keep heels together and still in space, without lifting or lowering
- ▶ maintain knees pointing over center of feet

## 2. WRAP TOES ON BAR

*footbar position #1, 3 or 4 springs, headrest adjusted for individual*

### STARTING POSITION

Distal ends of metatarsal on footbar, toes gently flexed around bar without clenching, ankles dorsiflexed. Legs parallel and adducted, knees flexed.

### EXERCISE

*To prepare, inhale...*

**EXHALE** keep heels still in space and extend knees to press carriage out.

**INHALE** flex knees and hips, controlling return of carriage.

*Complete 10–12 repetitions.*

### FOCUS

- ▶ all those listed on page 15
- ▶ maintain position of feet, do not allow toes to unwrap
- ▶ keep heels still in space, without lifting or lowering
- ▶ maintain inner thigh connection, with legs parallel

### MODIFICATION

1. **LONGITUDINAL ARCH.** Place deepest part of longitudinal arch of foot on footbar and gently flex toes to relieve cramping in toes.

## Footwork



1. starting position



2. press out



3. return

## Toes Apart Heels Together



1. starting position



2. press out

## Wrap Toes on Bar



1. starting position



2. press out

### 3. HEELS ON BAR

*footbar position #1, 3 or 4 springs, headrest adjusted for individual*

#### STARTING POSITION

Heels on footbar, ankles dorsiflexed.  
Legs parallel and adducted, knees flexed.

#### EXERCISE

*To prepare, inhale...*

EXHALE keep feet still in space and extend knees  
to push carriage out.

INHALE flex knees and hips, controlling return of carriage.

*Complete 10–12 repetitions.*

#### FOCUS

- ▶ all those listed on page 15
- ▶ keep soles of feet as though on an imaginary floor, still in space; allow movement at ankle joints
- ▶ maintain inner thigh connection, with legs parallel

### 4. HIGH HALF TOE

*footbar position #1, 3 or 4 springs, headrest adjusted for individual*

#### STARTING POSITION

Balls of feet on footbar, ankles plantar flexed.  
Legs parallel and adducted, knees flexed.

#### EXERCISE

*To prepare, inhale...*

EXHALE maintain heels lifted and extend knees to push  
carriage out.

INHALE flex knees and hips, controlling return of carriage.

*Complete 10–12 repetitions.*

#### FOCUS

- ▶ all those listed on page 15
- ▶ keep heels relatively still in space; do not allow them to drop significantly on press out
- ▶ maintain weight equally across balls of feet
- ▶ avoid overly plantar flexing feet and bearing weight on toes rather than balls of feet
- ▶ maintain inner thigh connection, with legs parallel

Heels on Bar



1. starting position



2. press out

High Half Toe



1. starting position



2. press out

# Footwork continued

## 5. LOWER & LIFT

*footbar position #1, 3 or 4 springs, headrest adjusted for individual*

### STARTING POSITION

Balls of feet on footbar, ankles plantar flexed.  
Legs parallel and adducted, knees flexed.

### EXERCISE

**INHALE** maintain heels lifted and extend knees to push carriage out.

**EXHALE** keep legs straight and lower heels under bar (dorsiflex).

**INHALE** lift heels (plantar flex).

**EXHALE** maintain heels lifted and flex knees and hips, controlling return of carriage.

*Add an additional lower and lift of heels each time, up to 6 repetitions.*

### FOCUS

all those listed on page 15

- ▶ keep heels relatively still in space; do not allow them to drop significantly on press out
- ▶ maintain weight equally across balls of feet
- ▶ avoid overly plantar flexing feet and bearing weight on toes rather than balls of feet
- ▶ maintain neutral pelvis as heels lower
- ▶ avoid medial and lateral rotation of femurs during lower and lift of heels
- ▶ maintain inner thigh connection, with legs parallel

### Lower & Lift



1. starting position



2. press out



3. lower heels



4. lift heels



5. return

## **ESSENCE [EXERCISES 1-5]**

**TARGET MUSCLES:** transversus abdominis to compress abdomen and stabilize lumbo-pelvic region; deep pelvic floor to aid in firing transversus; obliques to prevent spinal extension; obliques and multifidus to prevent rotation; vastus medialis and lateralis working to track patella properly

[1] hip extensors, quadriceps and adductors concentrically on extension, eccentrically on return; lateral rotators to maintain rotation at hip

[2] adductors isometrically to maintain adduction; hip extensors and quadriceps concentrically on extension, eccentrically on return; intrinsic muscles of feet to maintain toes wrapping

[3] adductors isometrically to maintain adduction; hip extensors and quadriceps concentrically on extension, eccentrically on return (emphasis on hamstrings); dorsiflexors of ankles maintain position of feet

[4] gastrocnemius and soleus to maintain plantar flexion; adductors isometrically to maintain adduction; hip extensors and quadriceps concentrically on extension, eccentrically on return

[5] gastrocnemius and soleus eccentrically as heels lower, concentrically as heels lift; adductors isometrically to maintain adduction

**STABILITY:** torso (pelvis, spine and rib cage); leg alignment, i.e. knees pointing over center of feet; ankles not rolling in or out, especially in 4 and 5

**MOBILITY:** hip and knee extension and flexion; ankle plantar flexion and dorsiflexion in 5

## **MODIFICATIONS**

1. **ALTERNATE BREATH [EXERCISES 1-4].** Inhale to press carriage out, exhale to return. To challenge engaging transversus abdominis on the inhale, maintaining lumbo-pelvic stability.

2. **SMALL RANGE PULSE [EXERCISES 1-4].** Press carriage halfway out and return fully, emphasizing the return with an exhale. To challenge neutral pelvic alignment and emphasize initiation with hip extensors to press carriage out and to 'brake' as carriage returns. Ideal for limited range of motion.

3. **END RANGE PULSE [EXERCISES 1-4].** Press carriage all the way out and return slightly, emphasizing the press out with an exhale. Focus on vasti pulling patella up as well as support at back of knee. Ideal for limited range of motion as well as for strengthening unstable knees.

4. **FEET SLIGHTLY ABDUCTED [EXERCISES 2-5].** Abduct legs, up to sit-bone distance apart. To help maintain parallel alignment through hip, knee and ankle.

5. **USE A SPACER.** Insert a rubber pad, foam cushion or small ball at knees and/or ankles to help maintain activation of the hip adductors. Use a Flex-Band exerciser tied around thighs just above knees to maintain activation of the hip abductors.

## **FOCUS ALL FOOTWORK EXERCISES**

- stabilize pelvis and lumbar in neutral position and avoid posterior or anterior tilt
- stabilize rib cage and scapulae throughout, to avoid upper body tension
- extend legs fully (except when doing small range variation) without 'locking' or overextending knees
- maintain alignment through center of hip, knee and ankle joints
- use vasti to track patella properly (vastus medialis often needs encouragement)
- both legs work equally in Footwork and Second Position
- maintain pelvis level, avoid rotation and laterally tilting
- avoid tension in upper shoulders and neck

# Hundred

*footbar position #1, 2 or 3 springs, headrest adjusted for individual*

## STARTING POSITION

Supine, imprinted position. Legs parallel and adducted in air, knees flexed (tabletop position). Elbows flexed by sides of body. Hands in straps, fingers long, palms facing away. Scapulae stabilized.

## EXERCISE

*To prepare, inhale...*

**EXHALE** lengthen back of neck, keep scapulae stabilized and contract abdominals to flex thoracic spine. Simultaneously, extend elbows, reaching arms by sides level with shoulders, and extend legs on a diagonal as low as imprint can be maintained.

*Then...*

**INHALE** for five counts, keeping upper body flexion, scapular and pelvic stability, while doing small vertical pulses with arms.

**EXHALE** for five counts while continuing to pulse arms.

*Complete 10 sets (a total of 100 counts).*

*To finish...*

**INHALE** remain in upper body flexion, flex knees and continue to reach arms.

**EXHALE** flex elbows and return upper body to carriage. Legs remain in the air.

**NOTE:** May be done starting in a neutral position and maintaining throughout once strength is gained and ability demonstrated.

## ESSENCE

**TARGET MUSCLES:** transversus abdominis to compress abdomen and stabilize lumbo-pelvic region; deep pelvic floor to aid in firing transversus; rectus abdominis and obliques concentrically to create and isometrically to maintain thoracic flexion and stabilize pelvis; lats and pec major to stabilize arms challenged by resistance from behind; hip flexors, adductors and quadriceps isometrically to maintain position of legs; scapular stabilizers

**STABILITY:** lumbo-pelvic region against weight of legs; upper body in flexion; scapulae during arm movement

**ENDURANCE:** abdominals to maintain thoracic flexion and stabilize pelvis throughout

## Hundred



1. starting position



2. flexed position



3. flex knees



4. return



## FOCUS

- maintain imprint throughout exercise
- stabilize thoracic flexion, rib cage and scapulae throughout to avoid neck tension
- stay wide across front and back of shoulder girdle with equal emphasis on anterior and posterior shoulder stabilizers to avoid protracting shoulders (carriage movement indicates loss of connection through shoulder stabilizers or pulsing from elbows)
- initiate movement of arms at shoulder joints rather than elbows
- avoid overworking rectus abdominis and flexing too high giving appearance of popping abdominals
- avoid overextending or 'locking' elbows
- keep wrist long without any 'breaking'

## MODIFICATIONS

1. **HEAD ON CARRIAGE.** To practice breath with arm movement. Focuses on scapular stabilization and full breath pattern.
2. **TABLETOP POSITION.** Maintain knees flexed in the air. Ideal to release hip flexors or as an intermediate stage to develop strength to stabilize pelvis and lumbar region with legs fully extended.
3. **NO STRAPS.** Perform Hundred just as in Matwork, to reduce work of latissimus dorsi, scapular stabilizers and abdominals.
4. **FEET ON FOOTBAR, NO STRAPS.** To reduce workload on abdominals, making it easier to stabilize lumbo-pelvic region.
5. **USE A SPACER.** Insert a rubber pad, foam cushion or small ball at knees and/or ankles to help maintain activation of the hip adductors.
6. **BREATHE IN STACCATO RHYTHM.** Helps promote full breath pattern and avoid holding breath.
7. **FLEX HIPS AND KNEES** for five counts on inhale (to tabletop position), then extend legs for five counts on exhale. Challenges coordination.

### Modification 2



*tabletop position*

# Bend & Stretch

## 1. PARALLEL

*footbar position #1, 2 springs, headrest adjusted for individual*

### STARTING POSITION

Supine, pelvis and spine neutral. Feet in straps, legs parallel and adducted with knees flexed and ankles dorsiflexed (keep feet just above knees so straps do not rub). Arms long by sides of body, palms down.

### EXERCISE

*To prepare, inhale...*

**EXHALE** keep inner thighs connected with legs parallel and press feet into straps, extending knees to move carriage out. Simultaneously, imprint, plantar flex ankles and gently point toes. Reach legs as low as imprint can be maintained.

**INHALE** flex knees and hips and dorsiflex feet, moving pelvis toward neutral as carriage returns.

*Complete 10 repetitions.*

**NOTE:** May be done starting in and maintaining a neutral position once strength is gained and ability demonstrated.

## 2. LATERALLY ROTATED

*footbar position #1, 2 springs, headrest adjusted for individual*

### STARTING POSITION

Supine, pelvis and spine neutral. Feet in straps, heels together, toes apart. Legs laterally rotated with knees flexed and ankles dorsiflexed. Arms long by sides of body, palms down.

### EXERCISE

*To prepare, inhale...*

**EXHALE** keep heels connected and legs laterally rotated and press feet into straps, extending knees to move carriage out. Simultaneously, imprint, plantar flex ankles and gently point toes. Reach legs as low as imprint can be maintained.

**INHALE** keep heels connected, flex knees and hips and dorsiflex feet, moving pelvis toward neutral as carriage returns.

*Complete 10 repetitions.*

**NOTE:** May be done starting in and maintaining a neutral position once strength is gained and ability demonstrated.

### Parallel



1. starting position



2. extend knees



3. flex knees

### Laterally Rotated



1. starting position



2. extend knees



3. flex knees

### 3. MEDIANLY ROTATED

*footbar position #1, 2 springs, headrest adjusted for individual*

#### STARTING POSITION

Supine, pelvis and spine neutral. Feet in straps, legs medially rotated with knees flexed somewhat and ankles dorsiflexed, so that knees and toes are touching (avoid exaggerating rotation at ankles by inverting feet). Arms long by sides of body, palms down.

#### EXERCISE

*To prepare, inhale...*

**EXHALE** keep legs medially rotated and press feet into straps, extending knees to move carriage out; allow knees to come apart but toes remain touching, ankles dorsiflexed. Simultaneously, imprint spine. Reach legs as low as imprint can be maintained.

**INHALE** keep toes touching and flex knees until they touch, moving pelvis toward neutral as carriage returns.

*Complete 10 repetitions.*

**NOTE:** May be done starting in and maintaining a neutral position once strength is gained and ability demonstrated.

#### ESSENCE [EXERCISES 1-3]

**TARGET MUSCLES:** transversus abdominis to compress abdomen and stabilize lumbo-pelvic region; deep pelvic floor to aid in firing transversus; obliques concentrically to create imprint and stabilize pelvis; obliques and multifidus to resist rotation; hip extensors and quadriceps concentrically on press out, eccentrically on return; vastus medialis and lateralis working to track patella properly

[1] adductors isometrically to maintain adduction

[2] adductors concentrically on press out, eccentrically on return; lateral rotators to maintain rotation at hip

[3] medial rotators to maintain rotation at hip

**STABILITY:** torso

**MOBILITY:** hip and knee extension and flexion

#### FOCUS [EXERCISES 1-3]

- ▶ use abdominals to maintain pelvic stability as legs extend
- ▶ work both legs equally and simultaneously along center line
- ▶ avoid 'locking' or overextending knees
- ▶ keep sacrum area on carriage as knees flex

#### MODIFICATION [EXERCISES 1-2]

1. KEEP ANKLES DORSIFLEXED to simplify coordination.

#### Modification 1



*keep dorsiflexion*

#### Medially Rotated



**1. starting position**

**2. extend knees**

**3. flex knees**

# **IMPORTANT**

Please keep this manual in a safe place.



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