

Reformer Spring Resistance: The Basics

Have you ever had a client ask you “How much weight is this?” Have you ever wondered what springs to use for different exercises on the reformer? Many programs offer a vague recommendation of how many springs to use for each exercise depending on your students, but sometimes they do not provide the underlying reason for the recommendation or the deeper understanding of what the specific resistance provides to a specific exercise.

In traditional strength training, the addition of more resistance (or weight) means a greater challenge for the exerciser. In Pilates, the challenge of resistance is much different; sometimes more resistance doesn't equal more challenge. One of the things that sets the Pilates method of exercise apart from “regular” or “traditional” fitness is that Pilates equipment depends on springs to provide resistance, rather than standard weight plates and/or barbells. Another is the way that Pilates employs, or uses, the resistance itself.

The Challenge of Resistance

In order to fully understand how, why and when to use springs in Pilates exercise, we must first gain a rudimentary understanding of the difference in the physics of springs versus weight plates. The nature, or physics, of standard strength training equipment is that the weight, or resistance remains constant throughout the exercise. Any exerciser, no matter their size or body mass, using a leg press machine loaded with 100 lb, will be moving the same amount of weight throughout the motion of the exercise. There will be an initial full effort in order to start the movement (remember that an object in motion already is easier to keep in motion), there will be the force needed to move the foot plate away

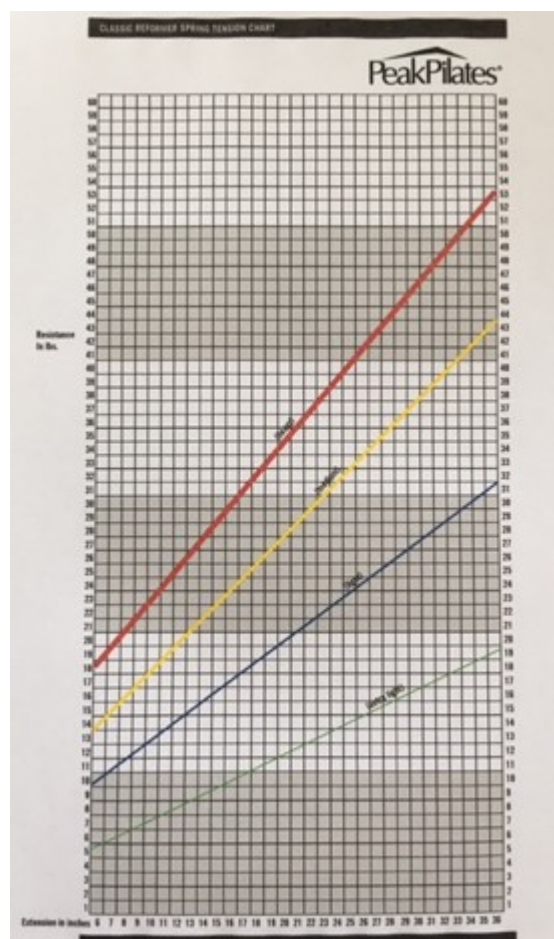
from the body, and there will be the effort needed to return the foot plate to the starting position without the weight crashing in towards the body. The resistance of 100 lb and the force of gravity remain the constant.

The physics of springs is much different. The type of spring that is used on Pilates equipment is called a "tension/extension spring". When this type of spring is stretched from its resting position, it exerts an opposing force proportional to its change in length. In other words, the more you stretch a spring, the more opposing force it provides. This means more force is required to overcome that opposition. In Pilates Reformer Footwork, there is an initial force needed to start the motion; a force needed to stretch the springs, and a force to return the carriage back to the home position. All of these same motions are required for the Leg Press. However, unlike the 100 lb move in the Leg Press, the force that has to be overcome in Footwork increases the farther away from the footbar the carriage is pulled, and decreases as the carriage returns home.

Peak Pilates recommends 3-4 springs be employed for Reformer Footwork. Using the chart below of the varied resistance the Peak Pilates springs provide, we can see that taller people will have greater resistance applied against them at the end range of the exercise (while the carriage is out), and will have to resist against more force initially as they bring the carriage back in. Conversely, shorter people will not extend the springs as far, so they will have less load to apply force to. Let's say one red, two yellow, and one blue spring is used. A person with a 36" inseam will have approximately 173 lb of load on them with the carriage all the way out, and a person with a 21" inseam will have approximately 118 lb of load.

The length/opposition variable of the springs enables us to teach to every BODY on the same equipment with the same springs, as long as that spring load is applicable to that

BODY. Of course, a deconditioned or injured body is going to be treated differently than a healthy body conditioned for Pilates work. An injured or deconditioned exerciser may not be able to safely apply the higher end pounds of force on their joints, so adjustments to the springs will be needed to accommodate those issues. The variability of working with the springs makes working with all abilities possible.



Resistance as Assistance

In Pilates exercise, the way we use resistance is just as important as the amount of resistance we use. Generally speaking, the more resistance there is, the more challenging it would be for the extremities; the less resistance there is, the more challenging for the powerhouse. Sometimes, the less resistance there is in the springs against the carriage, the more difficult the exercise is to perform. This is especially true in an exercise like Long Stretch.

At Peak Pilates, we suggest two springs be used to perform Long Stretch. If a 6'1" exerciser uses two yellow springs, there will be approximately 88 lb of resistance against the movement of the carriage. That is 88 lb pulling the carriage in, or in this case, slowing down or stabilizing the movement of the carriage away from the footbar. This will help the exerciser to stabilize their own body mass against the movement and will assist them with the return of the carriage from the stretched position. Using two blue springs, this same exerciser would only have approximately 60 lb of assistance with their stabilization. The Long Stretch would be more difficult to stabilize in the extended position and would become even less stable as the resistance decreases with the return of the carriage.

Assistance with greater spring resistance also occurs in the Short Spine Massage. The higher the spring tension, the more assistance is provided with getting the legs and pelvis up and over and allows for a deeper stretch for tighter backs as the hips roll back down to the mat. To challenge the powerhouse in this exercise, two blue springs would supply less assistance to the up and over, making the exerciser provide the effort needed to lift the legs and pelvis. Teaching a student to do the Short Spine Massage for the first time would probably require more spring resistance, while challenging an intermediate student in Short Spine Massage with less resistance would be appropriate. Like the Long Stretch, more resistance equals greater assistance equals less challenging than less resistance with less assistance.

Intention is Everything

Another variable to consider when choosing what springs to use is the intention of the specific exercise being performed. Intention could mean two things: the goal of that particular exercise, or the goal for that particular exerciser. While the goal for every Pilates exercise is to strengthen the

connection with the powerhouse, there are secondary goals that need to be taken into account. Having a deep personal connection and knowledge of each exercise is essential to being able to set specific goals for each student.

In the Classical reformer workout, everyone starts with Footwork. The intention for beginners is to build strength and flexibility, so higher spring resistance would facilitate this goal. Intermediate and Advanced students need to build a greater connection with the work, so a variable spring tension for Footwork could help achieve this goal. On the other hand, teaching greater hamstring activation requires a different way of looking at Footwork's intention for a specific client, like a cyclist who wants to attach the legs to the powerhouse for stronger pedaling. Using two blue springs in the Footwork would make the exerciser need to control the outward motion with a strong powerhouse and deeper connection to the pelvis. This would make the exerciser have to actively pull the carriage in with little assistance from the springs. As we can see, one exercise can have three different intentions with different spring requirements.

Another example of how intention can result in different the spring usage is with the simple beginner arm work. If the intention behind doing the exercise is to build arm strength, then one blue spring and one yellow spring would be a good starting point. If the intention is to teach scapular stabilization, two blue springs would challenge that skill with less assistance and therefore greater stabilization required. In the Elephant, the more spring resistance there is, the more hamstring/glute activation is required to pull the carriage away from the footbar; the less spring resistance used, the more the Powerhouse has to Scoop deep to pull the carriage back in. Same exercise, many different intentions.

Not All Springs Are Created Equal

Like the bodies of our clients, every spring is unique. Even springs of the same color may not be identical, and reformers have their own “personality” with particular springs. For instance, springs inside the Peak Pilates Classical line may behave differently than the metal line’s springs. A blue spring on a Classical reformer does not equal a blue spring on the MVe[®] reformer. The Classical nature of the Resistance Ride spring set offers a different feel from any other springs on the market today. Each reformer in a studio may have the same springs, but have completely different feels because of age of the springs, how the springs were used, and where the springs are placed within the gear itself (which makes a difference in the balance of the carriage). There are reformers with five springs, and there are reformers with four springs. The Classical four-spring set up order on the reformer is “Red-Yellow-Blue-Yellow”, and the traditional set up for reformers with four springs is “Yellow-Blue-Red-Blue-Yellow.” However, studios may have a different ratio and order of springs according to the needs of their clients. The total number of springs and their placement within the gear make a difference in the “feel” as well as the performance of the reformer. The only way to really know the resistance and personality of the springs on a specific reformer is to get on the equipment yourself and test it out.

Finally, you must think about your own connection to the work when considering the use of springs. This connection includes your knowledge of the precision points of each exercise, the skill in applying that knowledge to individual clients, and continuing your own exploration of Pilates exercise within your practice.

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