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# The Synergistic Effects of Percussive Therapy With Heat and Near-Infrared Light — a Therabody Labs Study

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Active individuals know that properly recovering from exercise is critical for optimal performance.

The body is innately resilient. It has internal mechanisms designed to help bounce back after physical activity. Now, technology can leverage these internal mechanisms during recovery and help to accelerate the body's natural processes.

Percussive massage therapy, vibration, heat, and near-infrared LED light are examples of tools that help enhance and expedite our own restorative abilities. These modalities, included in the **Theragun® PRO Plus** and Theragun Prime Plus can be leveraged before, during, and after a workout to benefit recovery.

New research from Therabody® Labs puts these therapies to the test. Therabody scientists wanted to understand if using heat and near-infrared LED light, in addition to percussive therapy, could improve key markers of recovery to a greater extent than percussive therapy alone.

The results provide insight into the benefits of using each modality and how to use each. This study validates that Theragun PRO Plus and Prime Plus combination of therapies offers synergistic benefits for recovering faster and stronger than using a single therapy.

Here, we'll share the key takeaways from Therabody Labs research on the Theragun. Discover scientifically validated ways to use a Theragun to improve your recovery routine.

## What Outcomes Were Measured?

Recovery is a dynamic process, and many dynamic markers measure it. There are multiple mechanisms involved in the way that the body recovers from daily physical activity. Changes and fluctuations in certain metrics are known for their potential to improve mechanisms of the recovery process. For the purposes of this study, researchers focused on the following non-invasive metrics:

- **Muscle Tone:** A favorable muscle tone means muscles have a good balance of tension and flexibility. Assessing muscle tone after exercise indicates whether muscles have regained balance or are still fatigued. [1]

# What Outcomes Were Measured?

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- **Muscle Tone:** A favorable muscle tone means muscles have a good balance of tension and flexibility. Assessing muscle tone after exercise indicates whether muscles have regained balance or are still fatigued. [1]
- **Muscle Elasticity:** Muscles that contract and relax efficiently have good elasticity, and a loss of elasticity is a sign of muscle fatigue. So, vibration therapy's ability to improve muscle elasticity is a sign of recovery. [2]
- **Muscle Relaxation:** After exercise, muscles typically tense up. In the hours following exercise, muscles start to relax, demonstrating proper recovery. If muscles remain tense long after a workout, it may signal the need for additional recovery to bounce back fully. [1]
- **Skin Temperature:** When you warm the tissue, you increase tissue oxygenation. More oxygenated tissue is better for recovery and performance. When you apply a heating pad to your skin, your skin is hot to the touch. But applying heat to muscles also stimulates processes beneath the skin, like increasing blood flow and improving recovery. [3]
- **Muscle Oxygenation:** The body typically goes into oxygen debt during strenuous activity and requires more oxygen to recover post-workout. Replenishing oxygen levels post-workout signals better recovery. So, muscle oxygenation is an important metric for both recovery and performance. [4]
- **Hemoglobin Levels:** Hemoglobin carries oxygen through the blood to the muscles. During intense exercise, hemoglobin releases oxygen to working muscles, and its levels drop. As hemoglobin levels stabilize, it signals muscle recovery. [5]

## How Do Multi-Therapy Theraguns Improve the Body's Metrics?

The Theragun PRO Plus combines traditional percussive therapy with heat, vibration, and near-infrared LED light therapy to create a multimodal, handheld, recovery, and performance tool. Each therapy type is backed by science, using the body's natural mechanisms to support its needs.

### Percussive Therapy

Percussive therapy supports increased blood flow to muscles, helping remove metabolic waste and accelerate the body's natural healing processes. The rapid pulsing motions also stimulate sensory receptors in the muscles, which signal the brain to promote muscle relaxation, reducing stiffness and tension. Percussive therapy used before, during, or after a workout can improve flexibility, range of motion, and strength while reducing delayed onset muscle soreness (DOMS) and muscle pain. [6, 7]

The Theragun PRO Plus device has five percussive therapy treatment speeds ranging from 1750 RPM-2400 RPM, where higher speeds are more intense. This allows for a customizable treatment based on your preferences and the soreness of your muscles.

### Heat Therapy + Percussive Therapy

Heat therapy can help improve experiences of pain, joint stiffness and tension, range of motion, and blood flow, in addition to the benefits of using percussive therapy alone. [2, 3, 8]

Theragun PRO Plus heat therapy attachment offers three heat therapy temperature options: low, medium, and high, at 113, 122 and 131 degrees Fahrenheit (45, 50, and 55 Celsius). Treatment temperatures were determined in Therabody Labs trials to warm the treatment area to ~44 Celsius, the skin temperature that offers the most therapeutic benefit without discomfort.

### Vibration Therapy

With a lower amplitude than percussive therapy, vibration therapy delivers lower-intensity pulses yet consistent pulses to the treatment area. This makes vibration therapy appropriate for joints and achy, painful areas to elicit similar benefits as percussive therapy. [9, 10]

Vibration therapy is offered at three low-intensity pulses in the Theragun PRO Plus: low, medium, and high: 47 Hz, 50 Hz, and 53 Hz, for customizable treatments.

### Near-Infrared LED Light Therapy + Percussive Therapy

Infrared LED light therapy can improve performance metrics such as the duration until exhaustion, the number of repetitions performed, isometric peak torque, and blood lactate levels. Infrared rays penetrate muscle tissue and can enhance the healing of activity-related injuries and wounds. It also improves oxygen availability to the muscles and helps to alleviate chronic muscle and joint pain. [5, 11, 12] These add to the benefits of using percussive therapy alone.

The amount of infrared LED light therapy delivered through the Theragun PRO Plus is scientifically designed to provide the optimal dose efficiently to benefit the body. The science of light therapy shows that you require approximately 20-60 Joules for small muscles and 60-300J of light for larger muscles to improve muscular performance and reduce fatigue. [11]

Theragun PRO Plus illuminates a 10 cm by 10 cm area at a power density of 40mW/cm2, delivering 360J to a muscle in approximately 90 seconds of treatment.

## How Was the Study Conducted?

Therabody Labs performed intensive internal testing on the Theragun PRO Plus modalities noted above for their potential to improve the body's metrics. In conducting this research, Therabody scientists aimed to provide objective insight into the effects of vibration, infrared LED light, heat, and percussive therapy on the body.

The study was conducted in 2023 at Therabody Labs — a dedicated R&D testing facility within the Therabody Headquarters in California. Therabody Labs is dedicated to creating innovative technology and rigorously testing it to optimize product development and help people maximize device benefits.

### Study Design

A convenience sample of 32 Therabody employees (aged 24 to 55; 14 males and 18 females) participated in some or all of the above modality testing. All subjects were in good health and did not have contraindications to the testing modalities.

Participants completed each of the four treatments at maximum intensity, four times each, for 30, 60, 90, and 120 seconds:

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Participants completed each of the four treatments at maximum intensity, four times each, for 30, 60, 90, and 120 seconds:

- Percussive therapy only
- Heat + percussive therapy
- Vibration therapy only
- Near-infrared LED light + percussive therapy

In the 24 hours before their testing session, participants abstained from using Therabody devices. Scientists took baseline measurements from participants' rectus femoris muscle, including muscle oxygenation, myography measures (i.e., stiffness, tone, elasticity, and relaxation), skin temperature, and infrared imagery. This data was collected using the following tools: Moxy, Myoton, FLIR camera, and IR thermometer.

The participants' rectus femoris muscle was treated in the same location with the Theragun PRO Plus for 30, 60, 90, or 120 seconds. The same measurements taken at baseline were repeated immediately following the treatment. Following a 24-hour washout period, each treatment was completed at each duration.

## Statistical Analyses

Therabody Lab scientists conducted all statistical analyses in R. Scientists compared baseline and post-treatment measurements at each of the four time points for each modality. This helped scientists to understand the ideal treatment length for each modality.

Outcomes were also compared between modalities to understand if certain modalities or combinations of modalities had greater recovery benefits than others.

## Theragun Improved the Body's Metrics Associated with Recovery

The study's results showed the device's efficacy on metrics associated with physiological recovery and how long it took participants to experience treatment benefits. Here's what they found.

### Percussive Therapy

Percussive therapy is the primary modality used in massage guns, including in Theragun devices. As found in previous studies, using percussive therapy alone provides significant recovery metric benefits.

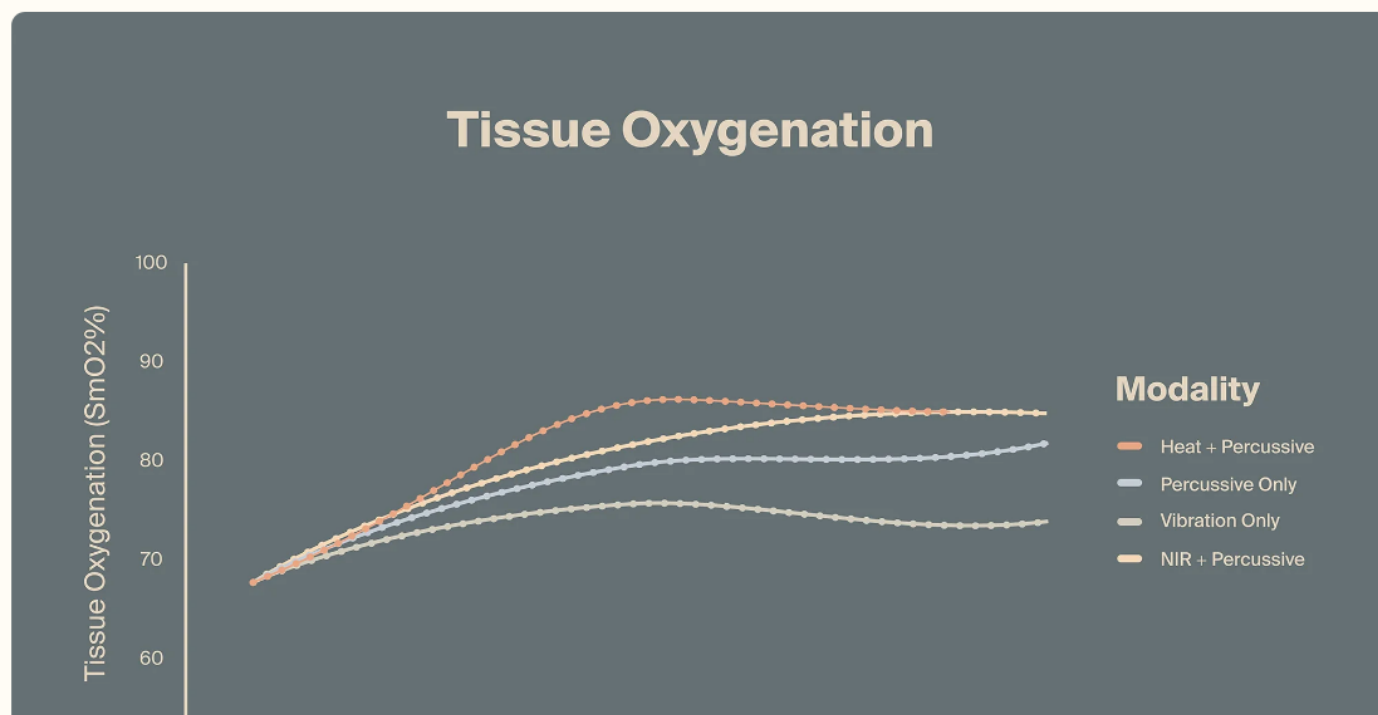
Following 90 seconds of treatment, percussive therapy improved tissue oxygenation by 22%. The body typically goes into oxygen debt during strenuous activity and requires oxygen to recover. Replenishing oxygen levels post-workout signals better recovery. [4]

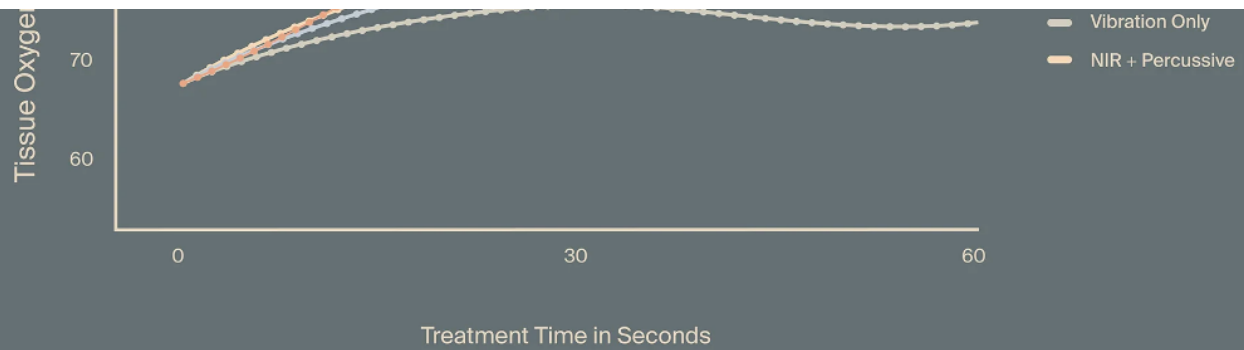
PRO TIP: Use percussive therapy on a muscle for a minimum of 60-90 seconds to maximize recovery benefits.

### Heat Therapy + Percussive Therapy

In the Theragun PRO Plus, heat and percussive therapy are used in tandem to deliver synergistic treatment effects.

After 30 seconds of heat and percussive therapy, the Theragun PRO Plus increased tissue temperature by 13% and tissue oxygenation by 24%. This was three times faster than percussive therapy alone. By increasing tissue temperature, blood flow indirectly increases. An increase in blood flow increases tissue oxygenation, allowing oxygen to be delivered to your cells, which is important for recovery. When you apply a heating pad to your skin, your skin is hot to the touch. Applying heat to muscles stimulates processes beneath the skin, like increasing blood flow and improving recovery. [3, 14]





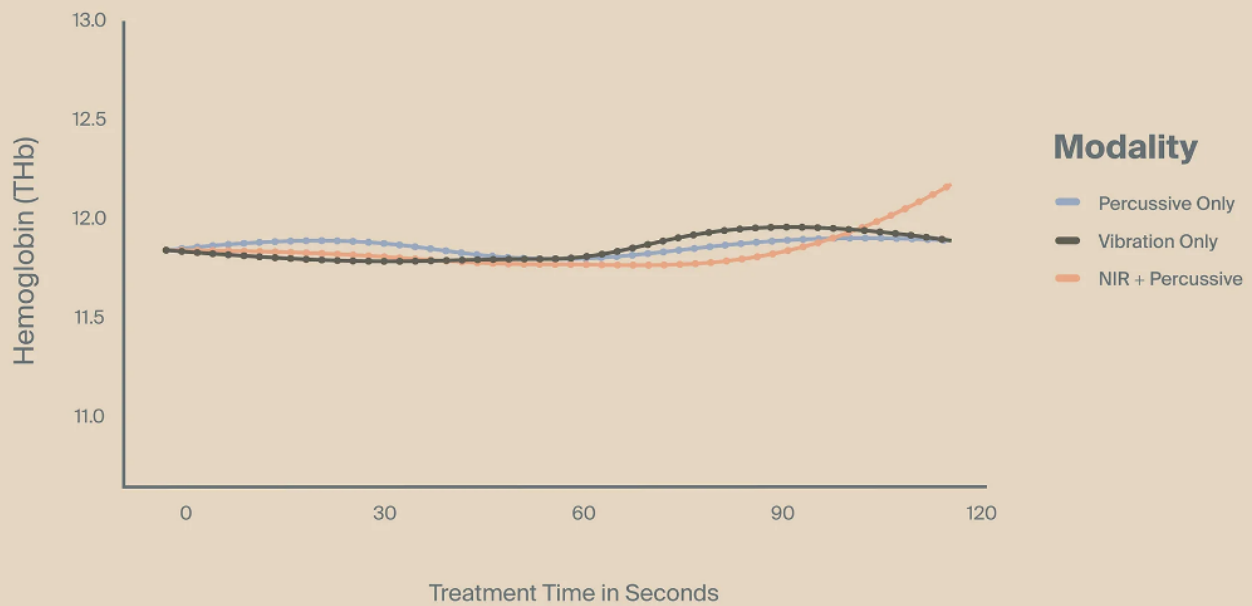
**PRO TIP:** If you're short on time and want to maximize recovery benefits, use the heat therapy attachment for about 30 seconds for quick yet effective recovery benefits.

## Vibration Therapy

Vibration therapy is most often used on sensitive areas like sore muscles and joints, as it is less intense than percussive therapy.

- Using vibration therapy for 90 seconds effectively improved muscle elasticity. Muscles that contract and relax efficiently have good elasticity, and a loss of elasticity is a sign of muscle fatigue. Vibration therapy's ability to improve muscle elasticity is a sign of recovery. [2]
- Using vibration therapy for 120 seconds improved muscle tissue oxygenation. Vibration therapy is a gentler version of percussive therapy, and the results showed that it took longer to increase tissue oxygenation than percussive therapy. [13]
- Using vibration therapy for 120 seconds improved hemoglobin levels. Hemoglobin carries oxygen through the blood to the muscles. During intense exercise, hemoglobin releases oxygen to working muscles, and its levels in the blood drop. As hemoglobin levels stabilize, it signals muscle recovery. [5]

## Hemoglobin Levels



**PRO TIP:** Use vibration therapy on sore muscles and joints for 90-120 seconds each to maximize recovery benefits.

## Near-Infrared LED Light Therapy + Percussive Therapy

Infrared LED light therapy can improve muscle tone and relaxation, aiding muscle recovery. Infrared LED light is used in tandem with percussive therapy in Theragun PRO Plus. Using these two modalities synergistically produced greater effects than using percussive therapy alone:

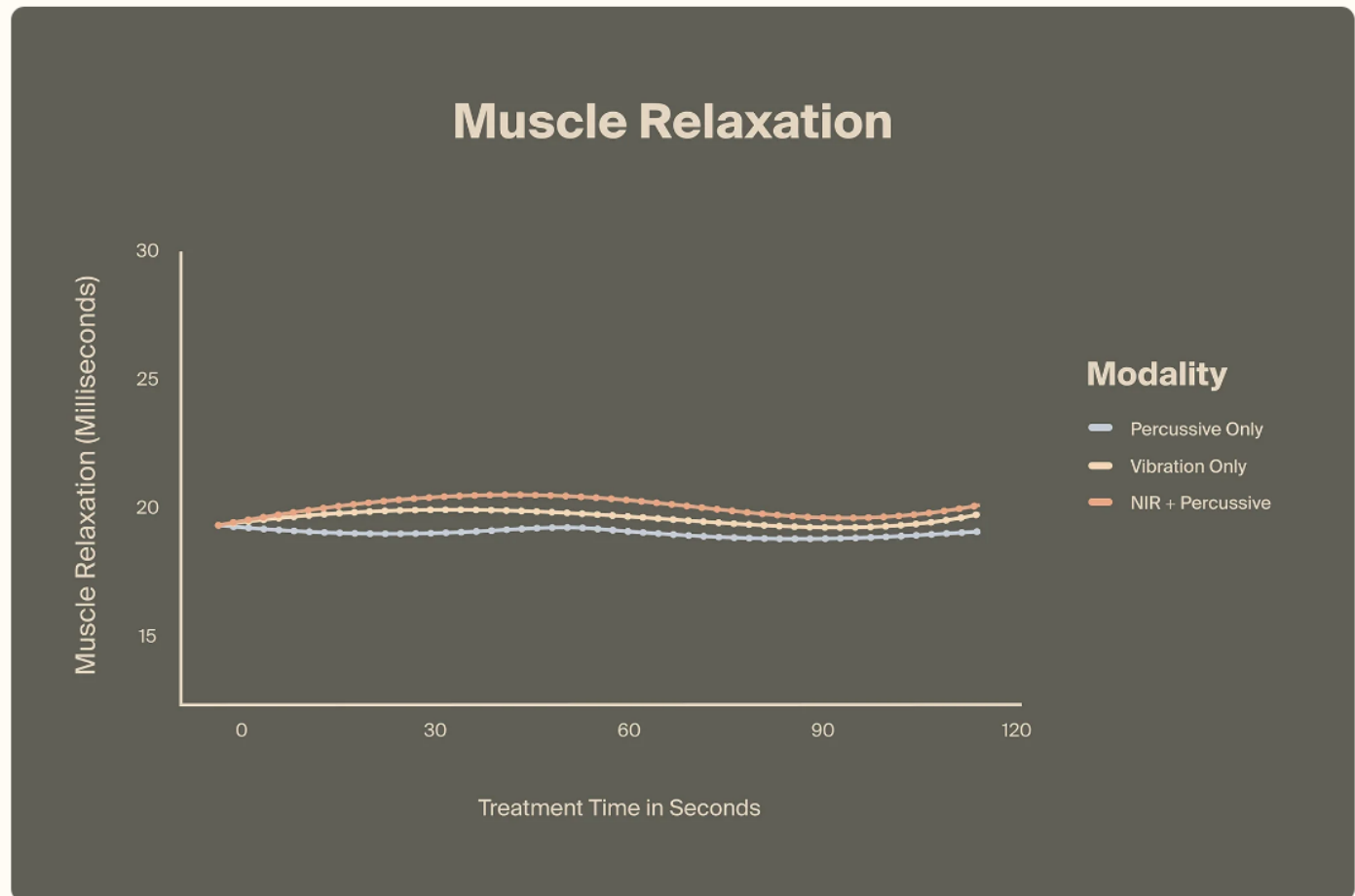
- Following 60 seconds of treatment, infrared LED light therapy improves muscle tone by 2.5% and muscle relaxation by 5.1%. 1.5 times faster than percussive

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- Following 60 seconds of treatment, infrared LED light therapy improves muscle tone by 2.5% and muscle relaxation by 5.1%, 1.5 times faster than percussive therapy alone. A proper muscle tone means muscles have a good balance of tension and flexibility. Assessing muscle tone after exercise indicates whether muscles have regained balance or are still fatigued. Relaxed muscles after exercise demonstrate recovery. If muscles remain tense post-workout, it signals they need more rest to bounce back fully. [1]
- Infrared LED light therapy also improves tissue temperature. Infrared LED light therapy warms the skin and muscle tissue. This warming effect allows blood vessels to dilate or expand, which can support increased blood flow. The improved circulation delivered by infrared LED light can reduce muscle stiffness and soreness. [15]



PRO TIP: Use infrared LED light therapy for around 30-60 seconds for an efficient and effective recovery.

## What Does This Mean for Recovery?

Recovery is a crucial component of athletic performance and overall wellness alike. It helps the body bounce back stronger after physical exertion — whether from strenuous workouts, a physically demanding job, or playing with kids and pets.

There are many ways that you can support proper recovery from activity. Tactics like getting quality sleep, rehydrating, practicing breathwork, and proper nutrition can all enhance your body's ability to bounce back from exercise. While recovering, the body repairs muscle fibers that are damaged during activity. By repairing muscle fibers that tear during exercise, muscles build back stronger.

But recovery doesn't always mean resting. Recovery is an ongoing, active, and multi-faceted process. Utilizing advanced recovery modalities between workouts and activities helps to improve common ailments like soreness to get you back to the activities you love faster. [16] This study demonstrates that Theragun PRO Plus and the modalities it includes: percussive therapy, vibration therapy, heat + percussive, and near-infrared LED light therapy + percussive therapy can help to improve metrics associated with proper recovery.

### Key Takeaways

- After 90 seconds of use on a specific muscle, percussive therapy improved recovery metrics.
- Combining heat and percussive therapy improved muscle recovery metrics three times faster than using percussive therapy alone, with benefits seen in just 30 seconds.
- Using vibration therapy on a muscle for 90-120 seconds can support recovery metric improvement.
- Near-infrared LED light and percussive therapy combined efficiently and effectively enhanced recovery metrics in 30-60 seconds.

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