Neufit System and the Neubie Device

Muscular Adaptations Between Low Load Resistance Training with Pulsed Direct Current Stimulation & Traditional High Load Training

The Neubie device is FDA-cleared for indications such as maintaining and increasing range of motion, increasing local blood flow, and neuromuscular re-education, which is directly related to muscle recruitment. Previous findings by the USF Muscle Lab have shown that no-load training with the Neubie causes similar acute muscle changes to high-load traditional weight training, making it a viable alternative muscle strength and hypertrophy training method.

The Neubie Creates Similar Muscle Changes as Traditional Weight Training

The most important factor in muscle growth is sufficient activation of muscle fibers, rather than the amount of load on the muscles. Growing evidence suggests that muscle growth can occur across a variety of intensities and training modalities. For example, 3 sets of 80% intensity or 3 sets of 30% intensity (3x/week) resulted in a similar muscle growth following 10 weeks of resistance exercise. Neuromuscular electrical stimulation like that of the Neubie is an attractive alternative to high-load training, as it has been shown to enhance muscle fiber activation, while also beneficially accelerating recovery in tissues by stimulating muscle protein synthesis and suppressing muscle protein breakdown. Previous work by the USF Muscle Lab supports the benefits of using the Neubie in training and was the first to show that no-load resistance training with the Neubie resulted in similar acute responses as traditional high load training in areas of increased muscle thickness, fatigue, and soreness, but with lower perceived exertion.

The Study

In this study, the team at the Muscle Lab sought to determine whether the Neubie-related acute muscle changes recorded previously would carry over to inducing long-term skeletal muscle growth in an 8 week training cycle. Their primary aim was to evaluate changes in muscle thickness, 1 rep max strength, and local muscle endurance before and after 8 weeks of two distinct training protocols: very low load resistance training with the Neubie vs. traditional high load resistance training.

Location: *University of South Florida Muscle Lab, Exercise Science Program, Tampa, FL*
Primary Investigators: *William B. Hammert, Enrique N. Moreno, Ecaterina Vasenina, and Samuel L Buckner*

Study Methods:

26 Participants
- Ages 18-35
- Must have trained lower body resistance exercise at least 2x a week for prior 6 months

Design:

18 Total Visits
- 1 Familiarization and baseline measurement session
- 16 training sessions (2x a week for 8 weeks)
- 1 post-training measurement session (48-72 hours after last training)

Measurements Included:

– Muscle Thickness (MTH) of the Thigh with Ultrasound at 5 Sites Measured at:
- **Anterior Aspect:** 40, 50, and 60% of the distance from the greater trochanter to the lateral condyle of the femur for the anterior aspect of the upper leg
- **Lateral Aspect:** 50% of the distance from the greater trochanter to the lateral condyle of the femur
- **Medial Aspect:** 8 cm proximal from the insertion of the vastus medialis

– Local Muscular Endurance (LME)
- Number of full repetitions completed until failure at 40% of pre-training 1RM

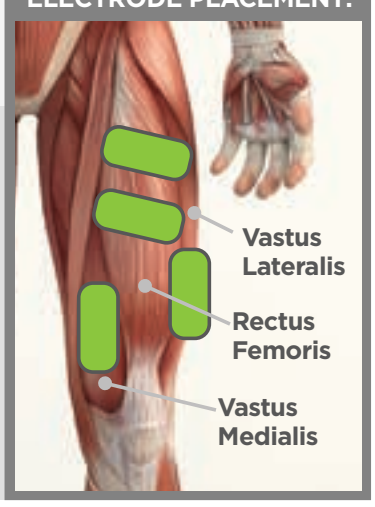
– Perceived Exertion (RPE)

Training Session Included:

– One leg assigned to traditional high-load training (TRAD)
- 4 sets to muscular failure at 70% of 1-rep max (1RM) with inter-set rest periods of 60s

– One leg assigned to Neubie low-load training (set at 7/10 perceived intensity and 55 hz)
- 4 sets of 20 repetitions at ~10% of 1RM and inter-set rest periods of 30s
- Neubie set at 55Hz with 7/10 perceived intensity

ELECTRODE PLACEMENT:



The Results

1 Muscle Thickness (MTH)

MTH increased by similar amounts for TRAD and Neubie in 4 of 5 measured regions:

ANTERIOR ASPECT:	LATERAL ASPECT:	MEDIAL ASPECT:
50% - 0.24CM 60% - 0.25CM	0.09CM	0.21CM
NEUBIE / TRAD	NEUBIE / TRAD	NEUBIE / TRAD

Note: at 40% of anterior aspect, TRAD muscle thickness was greater than Neubie (0.3cm vs 0.01cm) measured region, where there was no Neubie electrode placement. These findings suggest that Neubie training may be more effective at specific muscle activation than TRAD, making it uniquely useful for regional hypertrophy training.

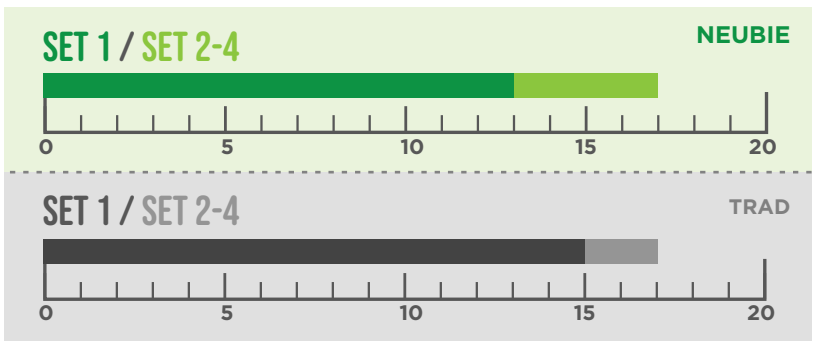
2 Local Muscular Endurance

LME increased by 5 reps for both TRAD and Neubie. This finding supports a similar change to muscles in both groups.

+5 REPS

3 Rated Perceived Exertion (RPE) Scale

RPE was initially higher for TRAD vs Neubie, but similar with increased sets. Findings suggest the difference in set 1 may be due to feeling of strain from heavier load, and indicate that as reps increased and muscles began to fatigue, RPE was similar for both groups.



CONCLUSION

The present study found that the application of the Neubie with low load knee extension resistance training was similarly as effective for increasing muscle size and local muscular endurnace as TRAD high load resistance training. With respect to RPE and ratings of discomfort, both training protocols elicited increases across exercise sets for the Neubie and TRAD training protocols. Further, location of electrode placement created specific muscle activation, which could be uniquely useful for regional specific Hypertrophy training. Overall, the data supports that training with the Neubie could be viable as an alternative to traditional training for promoting skeletal muscle growth and local muscular endurance.

REFERENCES: W.B. Hammert, E.N. Moreno, E. Vasenina, S.L. Buckner (2023) Muscular Adaptations Between Very Low Load Resistance Training With Pulsed Direct Current Stimulation (Neubie) and Traditional High Load Training. J Musculoskelet Neuronal Interac. https://www.ismni.org/jmni/accepted/JMNI_23M-06-073.pdf.