



The purpose of the Point/Counterpoint Column is to provide a respectful and balanced discussion in relation to controversial or current topics in the fields of strength and conditioning, nutrition, and human performance.

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Is Whole-Body Vibration Training Effective?

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ABSTRACT

WHOLE-BODY VIBRATION (WBV) TRAINING HAS RECEIVED CONSIDERABLE ATTENTION FROM RESEARCHERS AND PRACTITIONERS AS OF LATE. ALTHOUGH SOME FINDINGS SUPPORT ITS EFFICACY, OTHERS QUESTION ITS ABILITY TO IMPROVE HUMAN PERFORMANCE, PARTICULARLY WHEN USED IN TRAINED ATHLETES. THIS COLUMN WILL DEBATE THE MERITS OF WBV TRAINING FOR ATHLETES AND OTHERS. WE WANT TO HEAR FROM YOU. VISIT NSCA-SCJ.COM TO WEIGH IN ON THE POINT/COUNTERPOINT QUICK POLL.

POINT

The popularity of whole-body vibration training (WBV) has increased dramatically as a result of recent research supporting its effectiveness. WBV is typically administered to participants through mechanical stimulus (usually a plate on which the participant stands) that oscillates in different directions,

frequencies, and amplitudes. Other variables such as vibration exposure time, rest intervals, and the type of vibration plate also alter its effectiveness. The current literature strongly supports WBV, regardless of the specific combination of modifiable variables, in a variety of sport and human performance outcome measures. Although the mechanisms explaining the improvements in physical performance are still under investigation, WBV seems to enhance neuromuscular function (4) by increasing muscle spindle activity (2). This likely explains the improvements in muscular power, vertical jump performance (5,6), strength (2), and sprinting performance (3) seen after WBV.

One meta-analysis concluded that WBV improved explosive muscular power and vertical jump performance more than a standard exercise program (7). The review extended their recommendation to suggest that vertical jump performance would be further benefited with long duration, high frequencies, and high amplitudes WBV. A separate meta-analysis suggested that WBV is beneficial for power development in men and women of all ages (8). Although it is

generally not superior to traditional plyometric training, WBV requires less technical skill, time, and space; making it a legitimate option in some athletic circumstances. WBV has also been implemented as a recovery modality for athletes after delayed onset muscle soreness/damage as it is thought to inhibit pain receptors and decrease perceived pain (1). Anecdotally, athletes consistently claim to “feel better,” “more warmed up,” or “loosened up” after acute exposure to WBV. Athletes also report “less soreness” in the 24–48 hours postheavy lifting (1).

The primary counterargument is that the benefits of WBV often fail to exceed those of traditional power/strength training methods. However, assuming athletes meet WBV safety standards (4), the performance benefits often match the status quo. Little evidence suggests that WBV negatively affects performance. Thus, when taken together, the well-established relationship between power production and sport performance makes WBV a viable tool for coaches and practitioners. Importantly, this should not be confused with a call to replace current training paradigms with WBV,

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but simply to use it as a supplement or alternate. For example, coaches could use WBV on injured athletes until they are ready to return to full training.

In conclusion, incorporating WBV exposure to athletes during workouts, either as a warm-up method or during an active movement, can benefit athletic performance. WBV is a safe and time-efficient method to enhance power performance for athletes and has a clear role in strength and conditioning programs.

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REFERENCES

1. Aminian-Far A, Hadian MR, Olyaei G, Talebia S, and Bakhtiary AH. Whole-Body Vibration and the prevention and treatment of delayed-onset muscle soreness. *J Athl Train* 4: 43–49, 2011.
2. Bosco C, Cardinale M, and Tsarpela O. Influence of vibration on mechanical power and electromyogram activity in human arm flexor muscles. *Eur J Appl Physiol Occup Physiol* 79: 306–311, 1999.
3. Bullock N, Martin DT, Ross A, Rosemond CD, Jordan MJ, and Marino FE. Acute effect of whole-body vibration on sprint and jumping performance in elite skeleton athletes. *J Strength Cond Res* 22: 1371–1374, 2008.
4. Cardinale M and Bosco C. The use of vibration as an exercise intervention. *Exerc Sport Sci Rev* 31: 3–7, 2003.
5. Dabbs NC, Lundahl JA, and Garner JC. Effectiveness of different rest intervals following whole-body vibration on vertical jump performance between college athletes and recreationally trained females. *Sports* 3: 258–268, 2015.
6. Dabbs NC, Muñoz CX, Tran TT, Brown LE, and Bottaro M. Effect of different rest intervals after whole-body vibration on vertical jump performance. *J Strength Cond Res* 25: 662–667, 2011.
7. Manimmanakorn N, Hamlin MJ, Ross JJ, and Manimmanakorn A. Long-term effect of whole body vibration training on jump height: Meta-Analysis. *J Strength Cond Res* 28: 1739–1750, 2014.
8. Marin PJ and Rhea MR. Effects of vibration training on muscle power: A meta-analysis. *J Strength Cond Res* 24: 871–878, 2010.

COUNTERPOINT

The popularity of WBV has grown over the past decade. Numerous manufacturers claim that the use of their devices augments the beneficial effects of exercise and does so in less time than traditional training. Scientists have studied the effects of WBV on muscle strength, muscle power, balance, bone density, flexibility, and range of motion in well-controlled laboratory experiments in a variety of subjects (2,5–7). Although many of these studies have demonstrated positive effects on individual performance variables, it is difficult to relate WBV to improved athletic performance, points scored, or games won.

WBV increases afferent input to the brain by activating muscle spindles and enhancing function of the neuromuscular system. The neuromuscular systems of athletes are more fine-tuned than those of the nonathletic population. This likely explains why improvements in performance after WBV are far less substantial in athletes than in untrained subjects. For example, a recent WBV meta-analysis that examined the long-term effects on vertical jump height found greater improvements in nonathletic subjects as compared with athletes (5). Similarly, another meta-analysis that compiled the effects of WBV on muscle strength found that untrained subjects demonstrated greater relative strength improvements than athletes when training on a platform (6). Moreover, a third systematic review examined the effects of WBV on leg muscular performance and concluded that untrained individuals and older women had greater positive effects than an active population (11).

Finally, a recent systematic review and meta-analysis studied the acute and chronic effects of WBV on athletic performance in high-level athletes (2). This review did not include recreational athletes or active students in their data analyses. The investigators concluded

that WBV has small and inconsistent acute and chronic effects on athletic performance, leading the researchers to recommend traditional resistance training over WBV (2). Echoing these results, a separate systematic review of muscle strength and jump performance concluded that WBV provides limited additional benefits in active individuals when compared with performing the same exercises without WBV (9).

In addition to equivocal scientific evidence to support the use of WBV in athletes, practical barriers also exist. The cost of a WBV unit (typically several 1,000 dollars) is a barrier to many nonprofessional athletes. For most, the cost does not likely outweigh the benefits especially because the collective research indicates resistance training (3,4,10), and plyometric training (10) produce similar neuromuscular adaptations and/or improvements in performance. WBV is also unfeasible in team settings because the devices are designed to be used by one person at a time. Time is also a barrier to the efficacy of using WBV. Studies have revealed that longer training times >10 minutes produced greater increases in power (7) when compared with training times <10 minutes. Finally, there have been some adverse effects, albeit transient, reported after WBV such as erythema (12,13), itching of the legs (12,13), edema (12), and shin pain (1). One report described a severe reaction by an individual with undiagnosed kidney stones requiring significant medical attention (8).

In conclusion, although WBV does not negatively affect athletic performance, it seems that nonathletes, individuals with neuromuscular impairments or other comorbidities, and the elderly demonstrate greater gains from this type of training than athletes do.

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REFERENCES

1. de Ruiter CJ, Van Raak SM, Schilperoort JV, Hollander AP, and de Haan A. The effects of 11 weeks whole body vibration training on jump height, contractile properties and activation of human knee extensors. *Eur J Appl Physiol* 90: 595–600, 2003.
2. Hortobagyi T, Lesinski M, Fernandez-Del-Olmo M, and Granacher U. Small and inconsistent effects of whole body vibration on athletic performance: A systematic review and meta-analysis. *Eur J Appl Physiol* 115: 1605–1625, 2015.
3. Kvorning T, Bagger M, Caserotti P, and Madsen K. Effects of vibration and resistance training on neuromuscular and hormonal measures. *Eur J Appl Physiol* 96: 615–625, 2006.
4. Lamont HS, Cramer JT, Bemben DA, Shehab RL, Anderson MA, and Bemben MG. Effects of a 6-week periodized squat training program with or without whole-body vibration on jump height and power output following acute vibration exposure. *J Strength Cond Res* 23: 2317–2325, 2009.
5. Manimmanakorn N, Hamlin MJ, Ross JJ, and Manimmanakorn A. Long-term effect of whole body vibration training on jump height: Meta-Analysis. *J Strength Cond Res* 28: 1739–1750, 2014.
6. Marin PJ and Rhea MR. Effects of vibration training on muscle strength: A meta-analysis. *J Strength Cond Res* 24: 548–556, 2010.
7. Marin PJ and Rhea MR. Effects of vibration training on muscle power: A meta-analysis. *J Strength Cond Res* 24: 871–878, 2010.
8. Monteleone G, De Lorenzo A, Sgroi M, De Angelis S, and Di Renzo L. Contraindications for whole body vibration training: A case of nephrolithiasis. *J Sports Med Phys Fitness* 47: 443–445, 2007.
9. Nordlund MM and Thorstensson A. Strength training effects of whole-body vibration? *Scand J Med Sci Sports* 17: 12–17, 2007.
10. Perez-Gomez J and Calbet JA. Training methods to improve vertical jump performance. *J Sports Med Phys Fitness* 53: 339–357, 2013.
11. Rehn B, Lidstrom J, Skoglund J, and Lindstrom B. Effects on leg muscular performance from whole-body vibration exercise: A systematic review. *Scand J Med Sci Sports* 17: 2–11, 2007.
12. Roelants M, Delecluse C, and Verschueren SM. Whole-body-vibration training increases knee-extension strength and speed of movement in older women. *J Am Geriatr Soc* 52: 901–908, 2004.
13. Russo CR, Lauretani F, Bandinelli S, Bartali B, Cavazzini C, Guralnik JM, and Ferrucci L. High-frequency vibration training increases muscle power in postmenopausal women. *Arch Phys Med Rehabil* 84: 1854–1857, 2003.

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