Dependent t-tests were used to compare the DVs from pre to post RT intervention within experimental groups. Independent t-test were used to compare the gain scores for each of the DVs between experimental groups.

**RESULTS:** The VJ had a significant improvement from pre to post RT for both the BSQ (pre: 52.9±10.1, post: 56.0±10.9 cm) and FSQ (pre: 47.4±10.9, post: 49.9±12.1 cm) groups (p<0.05).

The 36.6 m sprint improved significantly from pre to post RT for both the BSQ (pre: 5.9±0.7, post: 5.6±0.5 sec) and FSQ (pre: 6.3±0.7, post: 5.8±0.6 sec) groups (p<0.05). The squat 1-RMs also improved significantly from pre to post RT for both the BSQ (pre: 100.5±34.2, post: 110.3±36.6 kg) and FSQ (pre: 77.8±31.0, post: 87.5±29.1 kg) groups (p<0.05). When comparing gain scores between each group there were no significant differences between the BSQ and FSQ groups for any of the DVs (p>0.05).

**CONCLUSION:** Within the parameters of this study, both FSQ and BSQ RT programs improved muscular strength, power and sprint speed in active individuals. Coaches and active individuals may consider the FSQ and BSQ as interchangeable squat modalities providing squat modality variability within RT protocols.

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### 3470 Board #158 June 1 8:00 AM - 9:30 AM
**Impact Forces When Exercising On The Freebounder™**

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(No relationships reported)

The Freebounder™ Fitness and Rehab Machine consists of a spring-loaded platform attached to a metal frame and has characteristics similar to those of a mini-trampoline. The Freebounder™ purportedly reduced the impact forces on the lower body during an aerobic workout.

**PURPOSE:** This study was designed to compare the ground reaction forces (GRF) and loading rate (LR) when subjects exercised on the Freebounder™ compared to walking and running on a treadmill and double leg-bouncing on a mini-trampoline.

**METHODS:** Eighteen volunteers (9 M and 9 F) between 19-28 years of age completed 4 conditions, in random order: walking at 3.0 mph on a motorized treadmill, running at 6.0 mph on a motorized treadmill, double-leg bouncing on a mini-trampoline at 80 jumps/min, and double-leg bouncing on the Freebounder™ at 60 bounces/min. During all testing plantar forces were collected using Loadsol in-shoe sensors. Data were recorded during the last 10 seconds of each trial, with 5 representative strides being analyzed for GRF and LR.

**RESULTS:** The GRF (Freebounder™ = 564 ± 126.2, walking = 918 ± 323.5, mini-trampoline = 1415 ± 353.2, running = 1668 ± 395.4) and LR (Freebounder™ = 518 ± 260.2, walking = 5315 ± 1094.1, mini-trampoline = 7454 ± 1988.1, running = 14555 ± 3895.7) were lower on the Freebounder™ compared to walking and running on a treadmill and double-leg bouncing on a mini-trampoline.

**CONCLUSION:** These finding suggest that the Freebounder™ is an excellent low-impact option for individuals looking for an alternative aerobic exercise modality compared to more traditional modes of exercise.

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### 3471 Board #159 June 1 8:00 AM - 9:30 AM
**Effects of Whole Body Vibration Training on Muscular Strength and Balance Ability of Elderly Men**

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(No relationships reported)

**PURPOSE:** As age, various functional functions of our body such as muscular strength and balance ability will gradually decline. The decline of muscular strength associated with aging is a major cause of decreased balance ability and gait instability. The purpose of this study was to examine the effects of whole-body vibration training (WBVT) on muscular strength and balance ability of elderly men.

**METHODS:** 30 elderly men aged 60-79 years, who met the inclusion criteria, were recruited and randomly assigned into training and control groups. Training group carried out 12-wk WBVT at the same amplitude (3mm) and frequencies (25-30Hz) on the Power-Plate vibration platform, while control group had no any training. Muscular strength of back and knee, static and dynamic balance ability were measured respectively by portable digital muscle strength tester (mPuroPET3, American) and dynamic balance assessment training system (Biodesi 950-440, American) before and after the experiment.

**RESULTS:** The core and lower extremity muscular strength of the subjects in training group were significantly enhanced after 12-wk WBVT, with the average increase of dorsal extensor muscular strength by 15.3% and extensor knee muscular strength by 7.42%; with the eyes open, the overall (1.93±0.49 vs. 1.70±0.29), left (1.26±0.47 vs. 1.18±0.32) and right (1.67±0.51 vs. 1.52±0.37) was reduced significantly, the overall (1.87±0.29 vs. 1.52±0.23), left (1.25±0.28 vs. 1.10±0.22) and right (1.62±0.36 vs. 1.45±0.30) was significantly improved. The overall (1.79±0.31 vs. 1.52±0.21), left (1.17±0.26 vs. 1.04±0.16) and right (1.61±0.30 vs. 1.41±0.22) was improved significantly. Meanwhile, there was no obvious change in muscular strength and balance ability in the control group at the end of experiment.

**CONCLUSION:** It was concluded that the core and lower extremity muscular strength as well as static and dynamic balance of elderly men could be improved with a 12-wk WBVT.

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### 3472 Board #160 June 1 8:00 AM - 9:30 AM
**Energy Contributions of Short-distance Running with Change of Direction in Tennis Baseline Practice**

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(No relationships reported)

Short-distance running with change of direction (SR-COD) is one of the baseline practice regularly performed in tennis training, but the energy contributions of this practice is relatively lacking.

**PURPOSE:** To investigate the energy contributions of tennis SR-COD, with the emphasis on the duration, distance, and frequency.

**METHODS:** 16 collegiate male tennis players (22.2 ± 1.7yrs, 175 ± 5cm, 69.2 ± 6.1kg) volunteered to this study. Two duration (1 and 2min), two distance (1 and 2m) and two frequency (20 and 30 stroke/min) were utilized, i.e. 1min-2m, 2min-2m, 1min-20stroke/min, 2min-20stroke/min, 1min-4m-20stroke/min and 1min-2m-30stroke/min. A portable spirometric system (K4b², Cosmed, Italy) was utilized to measure the ventilatory activities. Capillary blood from earlobe was collected and analyzed with blood lactate analyzer (Biosen CLine, EKF, Germany) prior to and post the test. The aerobic (Aer), anaerobic lactate (Ana), anaerobic lactate (Aanal) energy contributions were calculated with the method based on the accumulated oxygen uptake and lactate data during the practice, as well as the fast part of the oxygen uptake kinetics during the recovery, respectively. The relative energy contributions from the corresponding three pathways were also calculated as Aer%, Ana%, and Aanal%.

**RESULT:** The energy contributions of SR-COD was Ana 37.4±40.1kJ (32.1±41.7%), Ana 15.1±33.5kJ (14.8±30.4%) and Aer 37.8±100.8kJ (33.9±61.9%), respectively. With the increase of duration, distance and frequency, there was no significant change in Ana, there was significant increase in Aer in 1min (P<0.05), respectively. With the increase of frequency, further, %Aanal decreased with the increase of duration, distance, and frequency (P<0.05). %Ana enhanced significantly with the increased distance and frequency (P<0.05), but declined insignificantly with increased duration (P<0.05). %Ana increased significantly with longer duration (P<0.05), but reduced with longer distance and higher frequency (P<0.05).

**CONCLUSION:** Longer duration of SR-COD mainly increases the stimulation on Aer system, while longer distance and higher frequency of SR-COD mainly increases the stimulation on Ana energy. These findings should be taken into account when designing the SR-COD training program in tennis.