Participation in ultra-running events, particularly 100-mile races, is rapidly increasing, yet the physiological demands and dynamics during these events are not well-understood. It is clear that physical and metabolic costs of these events are quite high; most participants take 20-35 hours to complete the distance and burn upwards of 10,000 calories. As such, many 100-mi. events are reporting 30-50% “Did Not Finish” (DNF) rates among their participants. Ultra-runners are also challenged by sleep deprivation, which may lead to the decline of cognitive skills and reaction time over the course of these events, potentially leading to exhaustion or injury.

**PURPOSE:** To observe and assess physiological and cognitive dynamics during a 100-mile ultramarathon with relatively flat terrain (~7500 ft. vertical gain).

**METHODS:** Nine registered participants (age 46 ± 9.5 yrs., weight 74.0 ± 6.1 kg., height 176.4 ± 7.8 cm.) completed the 100-mile distance (Finish time 24.02 ± 3.23 hrs.). Measurements were collected pre-race, at each 20-mile interval (20, 40, 60, 80), and post-race. Measurements included lap time, foot volume, cognition, and reaction time. Foot volume was measured by making a figure-8 with cloth tape around the subjects’ bare foot and ankle. Cognitive performance was assessed using mental calculation and reaction time tests via IOS applications. The mental calculation test involved solving as many equations possible in 100 s, while the reaction test required the participant to tap the screen as many times as possible in 30 s. Comparisons were made across the 20-mile intervals using repeated-measures ANOVA.

**RESULTS:** While the duration to complete each 20-mi. lap significantly differed throughout the race (F(4,20)=7.896, p=0.001), no differences were found in foot volume (F(5,15)=2.13, p=0.118), reaction time (F(5,10)=9.45, p=0.493), or cognition (F(5,20)=8.96, p=0.503).

**CONCLUSIONS:** A relatively flat-terrain 100-mile distance does not elicit cognitive exhaustion or significant foot swelling. More research is needed to determine if there are other physiological or metabolic variables correlated with high DNF rates, and to compare these data to those of more “challenging” courses with greater elevation gain/loss.

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**902 Board #28 May 27 1:30 PM - 3:00 PM**

*Is There A Difference In Strength, Flexibility, Range Of Motion Between Postpartum And Nulliparous Runners?*

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(No relationships reported)

Research has shown that women are returning to sport as soon as two weeks after birth with most resuming running by two months postpartum. There are significant musculoskeletal and physiologic changes during pregnancy as well as the effects of childbirth that a postpartum runner to recover from to return to running. Research on returning to running guidelines are nonexistent in the postpartum population.

**PURPOSE:** To investigate the differences in strength, range of motion (ROM), and, flexibility between postpartum runners (PP) and nulliparous controls (NC).

**METHODS:** Healthy postpartum (up to 3 years) and nulliparous runners were recruited from local running groups. Three trials of strength, ROM and flexibility of the hip, knee and ankle were collected using a hand held dynamometer, inclinometer or goniometer respectively and then averaged. An independent samples t-test was performed to compare groups.

**RESULTS:** 28 runners participated (14 PP, 14 NC) and were matched for BMI (24.2 kg/sq.m). There were no significant differences in strength of the hip, knee and ankle between the groups. Right and left ankle dorsiflexion was significantly greater in PP group (Right Soleus: PP, 10.33±3.9cm; NC, 7.34±2.74cm; p=0.004; Right Gastrocnemius: PP, 7.95±2.74°; NC, 4.67±4.59°; p=0.032; Left Gastrocnemius: PP, 11.32±3.8cm; NC, 8.48±3.39°; p=0.026). Knee and Hip ROM were not significantly different between the groups.

**CONCLUSION:** The current study shows that postpartum runners have significantly more dorsiflexion ROM than controls. When breastfeeding, hormones that influence elasticity like prolactin are still present in the body which may be allowing for the postpartum women to have significantly more ROM than nulliparous controls. Future studies should investigate the effect of breastfeeding duration on range of motion in runners as well as if while breastfeeding return to running guidelines should be different than women that cease breastfeeding at different stages.

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**904 Board #30 May 27 1:30 PM - 3:00 PM**

*Effects Of A 4-week Supplemental Breathwork Program On Aerobic Performance Of Recreational Runners*

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(No relationships reported)

**PURPOSE:** This study investigated the effects of a novel supplementary functional breathing program (FBP) on the aerobic performance of recreational runners.

**METHODS:** Two groups of recreational runners participated in a 4-week aerobic endurance training program. One group supplemented the aerobic endurance training program with FBP (FBP; n=8, 34.8±5.1yrs, 25.3±2.5 kg/m²), and one completed the same aerobic endurance program, but not the FBP (CON, n=8, 28.8±5.4yrs, 22.7±2.3kg/m²). The 4-week running program consisted of 3 days of low intensity running (i.e. below aerobic threshold heart rate), and 1 day of high intensity interval running (i.e. above ventilatory threshold heart rate) per week. FBP consisted of daily breathing exercises completed at rest, and nasal breathing completed during low intensity running sessions. Subjects were tested before (PRE) and after (POST) 4-weeks of training. Testing included a breath holding test (BOLT) followed by a treadmill VO₂max test using a progressive workload. During the VO₂max test subjects wore a secure piece of tape covering their mouth under a face mask and were instructed to perform the VO₂max test to the best of their abilities using this induced nasal breathing condition. When they felt that they could no longer run with nasal breathing, the tape was removed, and the test continued under normal breathing conditions until VO₂max was reached. The maximal running time using nasal breathing only (MNRT) and maximal nasal breathing oxygen uptake (MBVO₂) were recorded and data were assessed using a two-way ANOVA (p <0.05).

**RESULTS:** No significant group×time interactions were found in MNRT, MBVO₂, or VO₂max. There was a significant group×time interaction in BOLT times [Δ from PRE: +1.9 sec (CON), +11.7 sec (FBP); p = 0.04]. There were significant time effects in MNRT (+58.7 sec, p=0.038), MBVO₂(+2.34 ml/kg/min, p=0.007), and VO₂max (+1.26 ml/kg/min, p=0.028), suggesting the training stimulus was adequate for the relatively short training program.

**CONCLUSION:** This study demonstrated that the 4-week supplementary functional breathing protocol was effective in increasing breath hold time at rest, but not MNRT, MBVO₂, and VO₂max, in recreational runners.

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**905 Board #31 May 27 1:30 PM - 3:00 PM**

*Should Runners Pay Less Life Insurance*

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**PURPOSE:** An ad “Can You Run An 8 Minute Mile?” (so that you could qualify for lower rates on life insurance) has brought lots of public attention and discussions, and the purpose of this study was to examine the scientific basis for this claim by examining the impact of physical fitness on modifiable health risk behaviors and related health care expenditures.

**METHODS:** Using keywords “Physical Fitness,” “Cardiorespiratory,” “Health Risks,” “Health Care Costs,” etc., a comprehensive literature search was conducted, and identified publications were reviewed and analyzed.