BARBELL BACK SQUATS DO NOT ILLICIT CHANGES IN HEPCIDIN, IRON, OR IL-6 IN RESISTANCE-TRAINED WOMEN

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BACKGROUND

- Hepcidin is a peptide hormone responsible for the regulation of iron.
- When hepcidin levels are elevated, iron reabsorption is shunted, thus, decreasing iron concentration.
- Endurance exercise can increase hepcidin and may lead to exercise-induced iron deficiencies.
- Hepcidin has been reported to have a positive relationship with IL-6.
- IL-6 has been shown to increase during resistance exercise.
- It is unclear if resistance exercise elicits changes in hepcidin concentrations.

PURPOSE

- To evaluate the acute effect of resistance exercise on circulating hepcidin, iron, and IL-6 concentrations in resistance trained women.

METHODS

- 12 resistance trained women participated in this repeated measures, counterbalanced study.
- Participants completed 3 sessions:
  1. Familiarization session- body composition assessment via air displacement plethysmography, standard warm-up, and 1-repetition maximum (RM) barbell back squat testing
  2. Traditional (TR) sets (session 2 or 3)- 4 sets of 10 repetitions at 70% 1 RM with 120 seconds of rest between sets
  3. Rest-redistribution (RR) sets (session 2 or 3)- 4 sets of 10 repetitions at 70% 1 RM with 30 seconds rest after 5 repetitions and 90 seconds between sets
- Blood samples were collected at baseline, 5-, 15-, 30-, 60-minutes, 24-, and 48-hours post-exercise.
- Hepcidin and IL-6 were assessed through ELISA.
- Iron was assessed through calorimetric assay in an auto analyzer.
- Condition by time repeated measures analysis of variance (RMANOVA) was used for analysis. Alpha was set at $p<0.05$.
- Pearson correlations between hepcidin, iron, and IL-6 were evaluated.

KEY FINDINGS

No differences in iron, hepcidin, or IL-6 were detected between traditional sets and rest-redistribution sets.

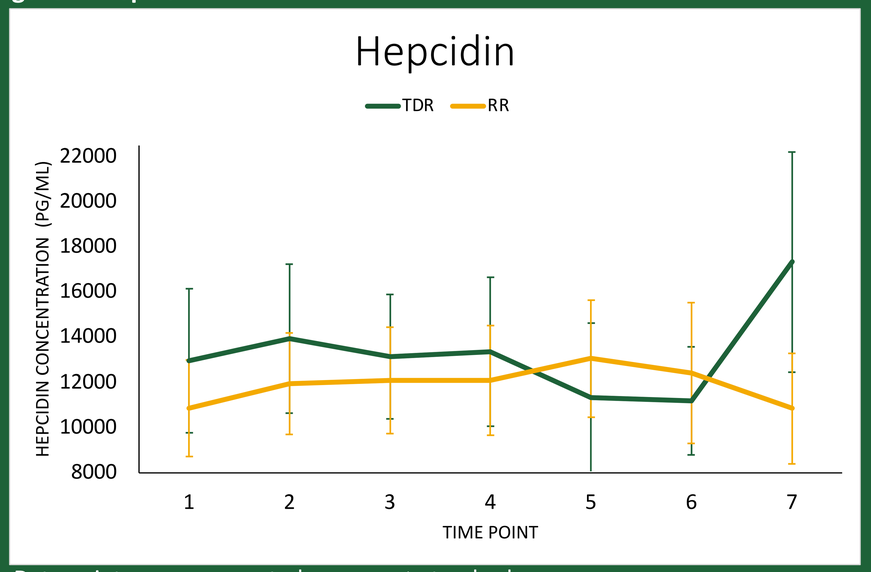
No differences in iron, hepcidin, or IL-6 were detected over time for traditional sets and rest-redistribution sets.

Table 1. Participant Characteristics

Characteristic	Participants (n=12)
Age (years)	23.7±4.1
Height (cm)	160±6.0
Mass (kg)	64.1±10.8
%BF	24.3±4.8
FFM (kg)	49.0±6.6
Training age (years)	2.0±2.2

Values are represented as mean ± standard deviation
%BF: percent body fat; FFM: fat free mass

Figure 1. Hepcidin



Data points are represented as mean ± standard error
TDR- Traditional; RR- Rest redistribution

RESULTS

- No differences were observed for condition for iron ($p=0.897$), hepcidin ($p=0.401$), and IL-6 ($p=0.933$)
- No differences were observed for time for iron ($p=0.601$), hepcidin ($p=0.084$), and IL-6 ($p=0.360$)
- No interaction of condition x time was observed for iron ($p=0.329$), hepcidin ($p=0.490$), and IL-6 ($p=0.328$)
- No meaningful correlations between iron, hepcidin, and IL-6 were identified

CONCLUSION

- TR and RR sets do not elicit acute changes in circulating iron, hepcidin, or IL-6 in resistance trained women.
- Relationships between iron, hepcidin, and IL-6 do not appear to exist following resistance training activity.
- Previous literature suggests IL-6 increases as a result of the volume or repetitions performed, not the intensity of the repetitions.
- 40 repetitions may be an insufficient volume to elicit changes in IL-6 in this population.
- The way in which rest was distributed throughout the repetitions did not appear to impact hepcidin, iron, or IL-6 with the current volume.

PRACTICAL APPLICATIONS

- When working with resistance trained women, who may be at risk for an iron deficiency, it does not appear that resistance exercise will increase hepcidin level sufficiently to result in an exercise-induced iron deficiency.
- It is recommended practitioners note the volume selected in a resistance training session, as a greater number than the present study may elicit changes in the variables measured.