

Post-match Recovery Strategies: Influence of Metabolic, Hormonal, Fluid and Electrolyte Responses in Badminton

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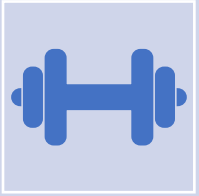
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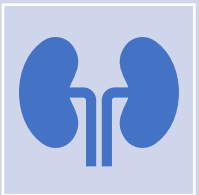


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Backdrop of the study



Post-exercise recovery is vital component of overall exercise training paradigm, and essential for continued high level performance



Mediate for post exercise recovery include damage to skeletal muscle, decreased energy substrates and accumulation of metabolic substrates – badminton's intermittent nature

Cardiovascular demands of badminton (junior singles matches)

- Max HR of 204 beats/min
- Max HR of 200 beats/min
- Average HR of 178 beats/min
- Average HR of 172 beats/min



Metabolic demands of badminton (junior singles matches)

- Mean post match lactate 4.02 ± 0.46 mmol/l
- Mean post match lactate 3.50 ± 0.37 mmol/l





Temporal characteristics of badminton (junior singles matches)

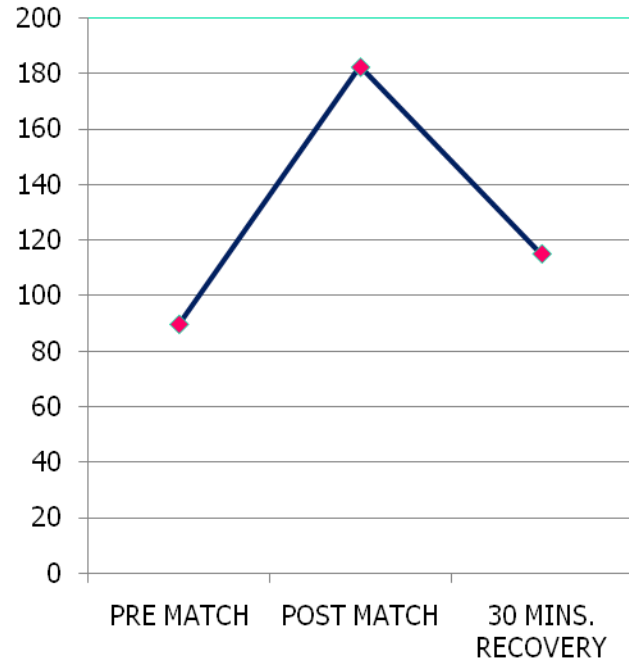
- Temporal characteristics of the game with an average work time of 6.8 and 6.2 seconds in case of men's and women's singles and the average rest time of 13.2 and 12.3 seconds, respectively.

Average duration of match:

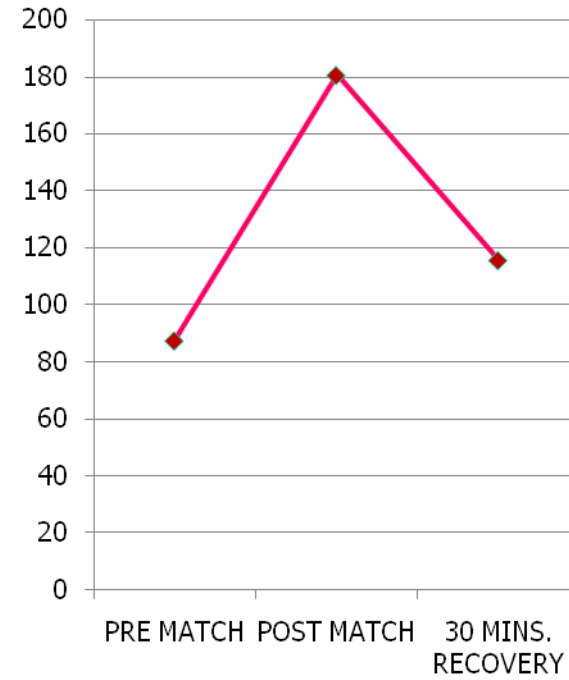
- Men's singles : 34.75 ± 6.03
 - Women's singles : 30.0 ± 5.91
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Heart rate responses for pre match, post match and thirty minutes post match recovery among junior players

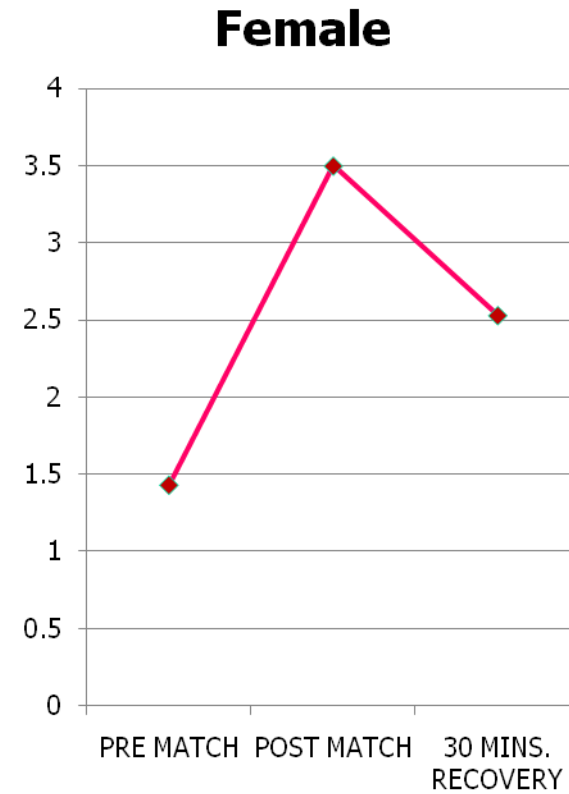
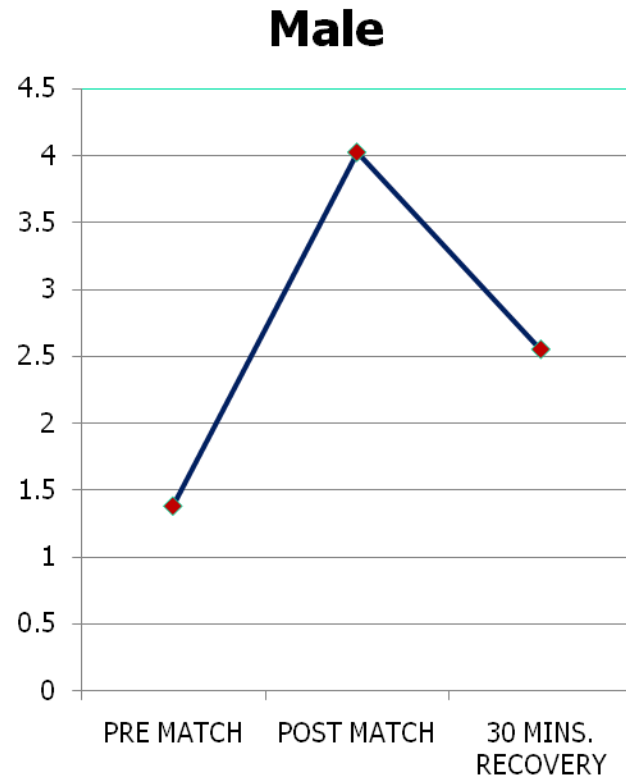
Male



Female

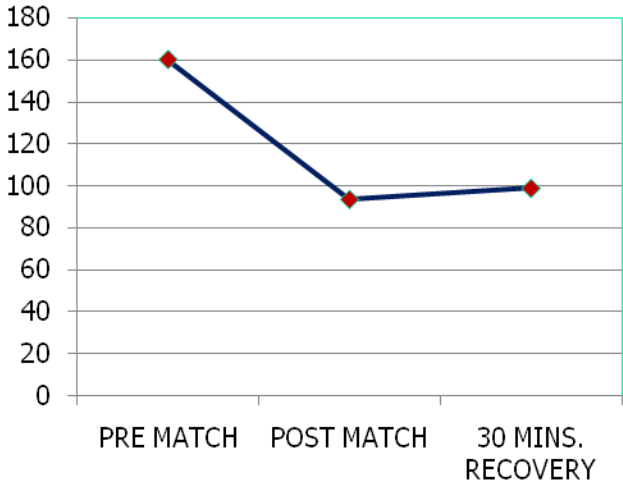


Plasma lactate responses for pre match, post match and thirty minutes post match recovery among junior players

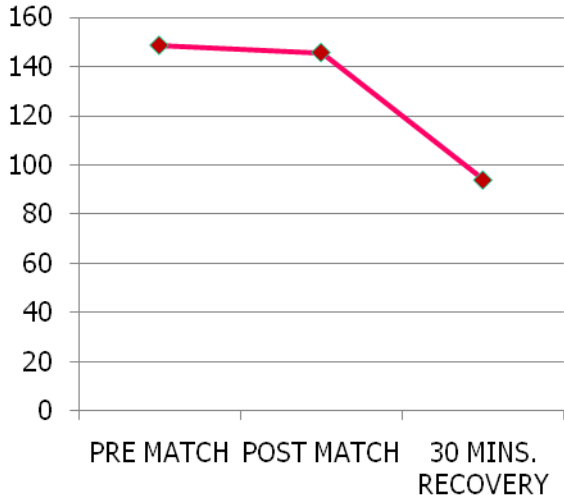


Urine sodium levels for pre match, post match and thirty minutes post match recovery among junior players

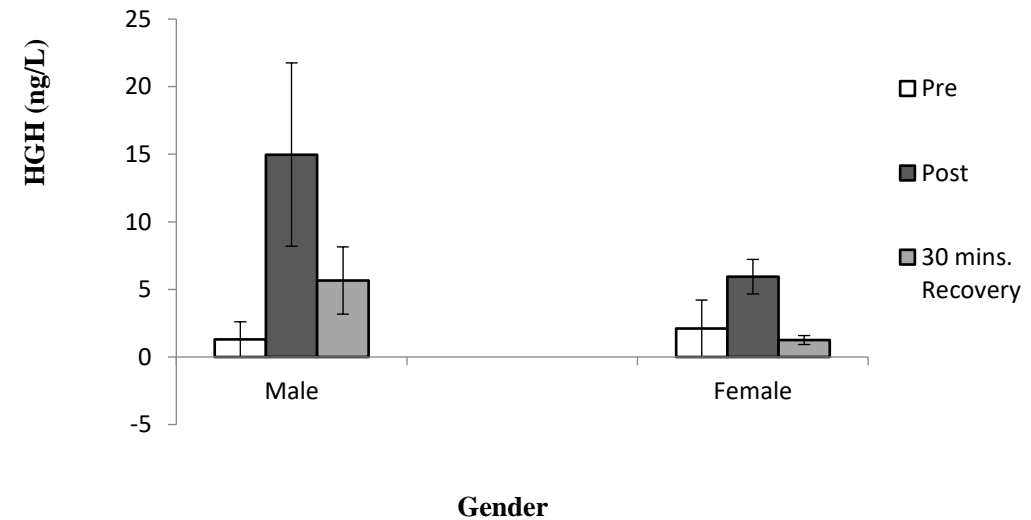
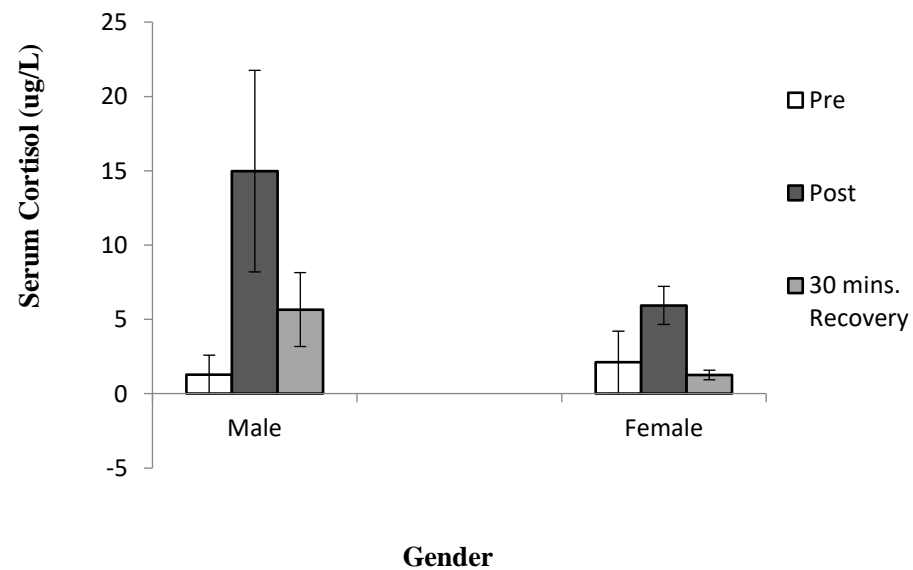
Male



Female



Hormone responses – pre, post and recovery match



Energy demands of badminton

01

The intermittent nature & short-lasting high intensity efforts interspersed with frequent rest intervals makes badminton game to have predominance in the alactic energy system

02

The demand on the phosphagen system is evident with the temporal characteristics of the game

03

However, the sustained effort exceeding 30 minutes in singles matches put considerable demand on the aerobic energy pathway as well.

Intra-individual Variability and Subsequent Performance

Range of values for fluid intake, sweat loss and electrolyte loss demonstrates large variability among the players.

The high variability in these cardiovascular and metabolic responses following badminton singles matches, and the lack of recovery to baseline after thirty minutes (HR, Lactate & Urine Na) may negatively affect performance in subsequent matches.

Follow up - Cohort study results

Study 1: Effect of post match recovery drink and Ice Immersion

- Blood lactate levels were significantly reduced from post match to recovery test for ice immersion and combination treatment (Recovery drink and Ice Immersion) as compared to control trial.
- Perceived muscle soreness ratings were significantly lower for the ice immersion and combination treatment as compared to control trails for difference from post match to 40 minutes recovery.

Study 2: Effect of Pneumatic Compression Device on Recovery Parameters

- The use of pneumatic compression device protocols seems to have some effectiveness in terms of reduced perception of muscle soreness, fatigue levels and perceived exertion among the participants.
- Use of pneumatic compression device for longer duration (sixty minutes) seems to facilitate better blood lactate recovery post exercise
- PCD use with increased pressure of compression and larger duration showed better trend in terms of effectiveness in decreasing the metabolic and inflammatory markers to pre-exercise levels as compared with the control trial.

Recommendations..

01

High intensity interval training with work rest ratio of 0.54 for male and 0.47 for female badminton players is recommended for training junior level players.

02

Players need to involve in active recovery mechanisms with adequate rest to ensure full recovery.

03

Schedule of tournaments need to be planned by providing adequate recovery time for players before subsequent matches.

Practical Applications – Recovery training

- Post match glycogen restoration to prevent compromised performance in subsequent matches
- Optimize training recovery - nutritional –CHO, protein and sodium bicarbonate
- Augment post-exercise and during match recovery – active recovery, CWI, stretching, massage, compression garments
- Recovery science which is under-researched – important consideration for subsequent matches and back-to-back schedule of tournaments.
- Badminton specific training and recovery guidelines to be framed considering health consequences of players.



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