Development and Validation of Changeover Recovery Strategy Assessment Tools in Competitive Tennis Players (16–25 Years)

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ABSTRACT

Changeover recovery plays a subtle yet decisive role in performance regulation in competitive tennis. Although players routinely engage in physical, mental, and tactical recovery behaviours during these brief intervals, systematic tools to assess such practices remain limited. The present study aimed to develop and validate context-specific research instruments in the form of a structured questionnaire and an observational schedule to assess changeover recovery strategies among competitive tennis players aged 16–25 years.

Tool development followed a structured multi-phase methodology involving literature review, preliminary observation of elite match play, expert consultation, and pilot testing. Recovery domains such as hydration behaviour, breathing regulation, posture and movement, emotional control, self-talk, tactical planning, and environmental interaction were identified and operationalised into measurable indicators. Content and face validity were established through evaluation by eight subject experts from sports coaching, sports science, and physical education. Expert feedback resulted in refinement of language, clarity, domain balance, and age appropriateness.

The final questionnaire consisted of 32 items distributed across physical, mental, tactical, and open-ended sections, while the observation schedule enabled systematic recording of visible recovery behaviours during changeovers. Pilot testing confirmed feasibility and clarity of both tools. The developed instruments provide researchers, coaches, and sports scientists with standardised means to assess changeover recovery behaviours and support evidence-based performance enhancement strategies in tennis.

Introduction

Tennis is an intermittent, high-intensity sport characterised by repeated explosive movements interspersed with brief recovery periods. Players must simultaneously manage physical fatigue, emotional fluctuations, and tactical decision-making across extended match durations. Unlike team sports, tennis offers limited opportunities for structured recovery, making the changeover period a critical phase for short-term restoration and performance recalibration.

During changeovers, players may engage in hydration, controlled breathing, stretching, equipment adjustment, emotional regulation, visualisation, and tactical planning. While such practices are widely acknowledged within coaching and performance settings, their assessment remains largely informal, subjective, and inconsistent. Existing research in tennis has primarily focused on physiological demands, match load, and injury profiles, with comparatively limited emphasis on systematic evaluation of recovery behaviours during changeovers.

The absence of validated assessment tools restricts both scientific investigation and applied coaching practice. This limitation is particularly evident among players aged 16–25 years, a transitional developmental phase during which athletes move from supervised junior participation to independent competitive performance and recovery management. Therefore, there is a need for structured, validated tools that can capture both self-reported and observable recovery strategies during changeovers in competitive tennis.

Methodology

The study adopted a tool development and validation research design, focusing on the systematic construction, expert validation, and pilot testing of instruments designed to assess changeover recovery strategies in tennis.

Development of the Questionnaire

An extensive review of literature related to tennis physiology, recovery strategies, sport psychology, and match behaviour was conducted to identify key recovery domains relevant to changeovers. Based on this review and preliminary observations, recovery strategies were categorised into physical, mental, and tactical domains.

An initial pool of questionnaire items was developed using simple and player-friendly language suitable for the 16–25 years age group. The draft questionnaire was evaluated by eight subject experts from the fields of sports coaching, sports science, and physical education. Experts assessed the items for relevance, clarity, redundancy, and practical applicability. Based on expert feedback, items were revised, reworded, or eliminated to ensure clarity, balance across domains, and age appropriateness.

The final questionnaire comprised 32 items distributed across four sections: physical recovery (12 items), mental recovery (7 items), tactical recovery (8 items), and open-ended responses (5 items). Pilot testing was conducted on competitive tennis players to assess clarity, comprehension, and feasibility in competitive settings.

Development of the Observation Schedule

An observation schedule was developed to systematically record visible recovery behaviours during changeovers. Preliminary observation of an elite-level tennis match (Isner vs. Mahut, Wimbledon 2010) was conducted to identify observable recovery behaviours. These behaviours were grouped into domains such as hydration and nutrition, posture and movement, breathing and stretching, equipment handling, emotional expression, and interaction with the competitive environment.

Each domain was operationalised into specific, observable indicators suitable for live match observation. The observation schedule was reviewed by subject experts for objectivity, clarity, and feasibility. Field application during local competitive matches confirmed its usability without disrupting match flow.

Population and Sample

The population comprised competitive tennis players aged 16–25 years and subject experts from sports coaching, sports science, and physical education. Purposive sampling was used to select eight experts for content and face validation. Competitive tennis players within the specified age range were selected through convenience sampling for pilot testing of the questionnaire.

Results

Expert evaluation confirmed strong content relevance across all identified recovery domains. Suggested modifications primarily related to item clarity, simplification of language, and elimination of redundancy. Pilot testing revealed high levels of comprehension and ease of administration among players. The observation schedule enabled systematic and objective recording of recovery behaviours during changeovers without interfering with match dynamics.

Discussion

The findings of the study indicate that structured assessment of changeover recovery strategies is both feasible and meaningful in competitive tennis contexts. The combination of self-reported questionnaire data and direct observational assessment provides a comprehensive understanding of recovery behaviours. The tools developed in this study address a significant gap in tennis performance research by offering validated instruments specifically designed for changeover recovery assessment.

Focusing on players aged 16–25 years enhances the applicability of the tools to athlete development, as this stage represents a critical transition towards performance autonomy and self-regulated recovery practices. The tools may assist coaches and sport scientists in identifying effective recovery behaviours and areas requiring intervention.

Conclusion

The present study successfully developed and validated a structured questionnaire and an observation schedule to assess changeover recovery strategies in competitive tennis players aged 16–25 years. The tools demonstrated strong content relevance, clarity, and practical feasibility. Their application can facilitate systematic analysis of recovery behaviours and contribute to evidence-based performance enhancement strategies in tennis.

Recommendations

Based on the findings of the study, the following recommendations are made:

1. Coaches and sport scientists may use the developed tools to monitor and improve players' recovery behaviours during competition.

2. Tennis academies may incorporate changeover recovery education into athlete development programmes.

3. Future studies should examine the reliability and construct validity of the tools on larger and more diverse samples.

4. Researchers may explore relationships between changeover recovery strategies, fatigue indicators, and match performance outcomes.

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