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Qualitative Analysis of Sports Injury Management and Physical Rehabilitation in Elite Badminton Athletes

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Abstract

Background: Badminton's high-intensity demands (strength, speed, agility, endurance) elevate musculoskeletal injury risk in elite athletes.

Objectives: To analyze injury management and physical rehabilitation experienced by Kevin Sanjaya Sukamuljo and Marcus Fernaldi Gideon using a qualitative, secondary-data design.

Methods: Qualitative content analysis synthesizing interviews, news reports, and match summaries about injury history, management, and rehabilitation; themes were derived by open–axial–selective coding.

Results: Three themes emerged: (1) Injury typology and load (hamstring, knee, ankle, back, chronic shoulder); (2) Management pathways integrating physical therapy and sport therapy; (3) Rehabilitation and return-to-play (RTP) decision-making emphasizing progressive loading, monitoring, and strategic withdrawal. Illustrative quotations accompany each theme.

Conclusion: Integrated physical therapy, sport therapy, and systematic rehabilitation—personalized to injury type—are essential to restore performance and prevent reinjury in elite badminton.

Keywords: badminton; physical therapy; sport therapy; rehabilitation; injury management; qualitative analysis

INTRODUCTION

Badminton is widely recognized as one of the most demanding racket sports, requiring athletes to perform rapid accelerations, sudden decelerations, explosive jumps, deep lunges, and repeated overhead strokes within short intervals(Pengked, 2025). These intense physical demands exert considerable strain on the musculoskeletal system, particularly the shoulder, knee, ankle, and lower back regions. Previous research highlights that injuries are common among elite badminton players (Hidayat & Ihsan, 2024). For example, Goh et al. (2013) reported that nearly 60% of all injuries involve the lower limbs, while persistent shoulder problems remain a major concern for athletes who regularly execute overhead movements. Similarly, the Badminton World Federation (BWF) Injury Surveillance Report (2022) indicated that top players often compete in more than 15 international tournaments each year, creating an excessive training and competition load that increases the likelihood of reinjury (Marchena-Rodríguez et al., 2020).

Given this context, effective injury management and rehabilitation strategies are essential to preserve performance and extend the careers of elite athletes (Afzal et al., 2024). When injuries are poorly managed, players not only risk underperforming in the short term but also face long-term consequences that may reduce their professional lifespan (Kovacs & Ellenbecker, 2019). Recent return-to-play (RTP) frameworks stress the need for an integrated approach that combines physical therapy, sport-specific conditioning, and psychological readiness to reduce recurrence and support safe reintegration into competition (Arundale et al., 2018). However, much of the existing literature in badminton remains focused on epidemiological data and injury incidence rates, leaving a gap in qualitative research that examines the lived experiences of athletes undergoing rehabilitation (Shaharudin et al., 2024).

The careers of Indonesian badminton stars Kevin Sanjaya Sukamuljo and Marcus Fernaldi Gideon—popularly known as "The Minions"—provide a valuable lens through which to explore this issue (Sharma et al., 2025). As former world number one men's doubles players (2017–2021), they sustained a range of musculoskeletal problems, including hamstring, shoulder, ankle, and back injuries, which had direct implications for their training capacity, tournament schedules, and international rankings (Gasibat et al., 2023). Examining how these high-profile athletes navigated injury management and rehabilitation not only offers insights into best practices but also highlights the challenges of balancing recovery with the demands of elite competition (Dhawale, 2025).

This study aims to address the identified research gap by conducting a qualitative content analysis of secondary data related to Sukamuljo and Gideon's injury histories. The analysis focuses on three key areas: (a) the types and loads of injuries sustained, (b) management pathways involving both physical therapy and sport-specific rehabilitation, and (c) decision-making processes surrounding rehabilitation and RTP. By situating their experiences within the broader framework of sports medicine literature, this article seeks to contribute both theoretically and practically to the understanding of injury prevention, management, and rehabilitation in elite badminton.

METHODS

Study Design and Participants

A qualitative research design with content analysis was employed. The unit of analysis comprised public materials on Kevin Sanjaya Sukamuljo and Marcus Fernaldi Gideon related to injuries and rehabilitation (media interviews, sports news, match reports, and relevant literature).

Research Instruments

The primary instrument was the researcher, supported by a coding guide (Woods et al., 2018). Documents were screened for relevance to (a) injury type/history, (b) management actions, and (c) rehabilitation/RTP steps (Kibler & Safran, 2018).

Data Analysis

Open coding identified meaning units; axial coding clustered codes into subthemes; selective coding derived final themes. Credibility steps included source triangulation across multiple reports and memoing of analytic decisions (Prentice, 2021)

RESULTS

Theme 1 — Injury typology and load

Summary. Recurrent hamstring and knee problems (KSS) and ankle/back issues (MFG) coexisted with a chronic shoulder condition since 2017, influencing both athletes' training tolerance and competitive readiness(Gabbett, 2016).

Key codes. Chronic shoulder pain (KSS); Back strain (MFG); Ankle support need (MFG).

Illustrative quotations.

> Q1 (KSS, shoulder): "*I've carried this shoulder problem since 2017; some days the pain limits my smash and reach."*
>
> Q2 (MFG, back/ankle): *"Tight scheduling aggravated my back, and the ankle needs extra support before high-intensity drills."*

Theme 2 — Management pathways (physical therapy + sport therapy)

Summary. Management strategies integrated manual therapy, cryotherapy, and core/balance exercises to restore joint stability, reduce stiffness, and enhance tolerance for high-intensity training (Anderson & Williams, 2017).

Key codes. Manual therapy; cryotherapy; core strengthening; balance training.

Illustrative quotations.

Q3: *"Hands-on work reduced stiffness; cold therapy helped me tolerate the next session."*

Q4: *"Core and balance drills made my lunges more stable during fast exchanges."*

Theme 3 — Rehabilitation & RTP decision-making

Summary. Athletes emphasized recovery prioritization, gradual loading, and strategic withdrawal from tournaments to prevent reinjury and support long-term functional recovery (Guermont et al., 2023). Rehabilitation monitoring guided their return-to-play readiness based on mobility and performance indicators (Marchena-Rodriguez et al., 2023).

Key codes. Recovery prioritization; delayed return-to-play; rehabilitation monitoring.

Illustrative quotations.

Q5: *"We chose recovery over one event—returning too early risks a bigger setback."*

Q6: *"Monitoring showed I was not at RTP criteria, so we extended rehab another cycle."*

Table 1. Data Summary Results

Theme	Salient codes	Representative quotations
1. Injury typology & load	Chronic shoulder pain (KSS); Back strain (MFG); Ankle support need (MFG).	Q1, Q2
2. Management pathways	Manual therapy; cryotherapy; core strengthening; balance training.	Q3, Q4
3. Rehab & RTP	Recovery prioritization; delayed return-to-play; rehabilitation monitoring.	Q5, Q6

Note. Author source

DISCUSSION

The findings of this study reinforce a biopsychosocial perspective on sports injury management, highlighting how chronic conditions, acute flare-ups, and rehabilitation strategies interact with athletes' performance and long-term career sustainability (Clarsen et al., 2019). By analyzing the experiences of Kevin Sanjaya Sukamuljo (KSS) and Marcus Fernaldi Gideon (MFG), three key themes emerged: injury typology, management pathways, and rehabilitation decision-making (Nugraha et al., 2023).

Theme 1 — Injury Typology and Load

The interviews revealed that KSS has long endured chronic shoulder pain, which continues to restrict his smashing ability and range of motion, while MFG frequently faced back strain aggravated by scheduling demands and an ankle support need during high-intensity drills (Ekstrand et al., 2020). These conditions echo earlier findings that badminton's repetitive overhead actions predispose players to shoulder injuries (Jeon et al., 2024), while lower-limb demands such as lunges and jumps make the knees and ankles highly vulnerable (Goh et al., 2013). The athletes' narratives show that their injury profiles are directly linked to the physical intensity of elite badminton and the cumulative strain of dense competition schedules (Denis et al., 2025).

Theme 2 — Management Pathways (Physical Therapy and Sport Therapy)

Both athletes reported that manual therapy and cryotherapy helped reduce stiffness and supported tolerance for subsequent sessions, while core strengthening and balance training enhanced stability during rapid lunges and exchanges (Bishop, 2021). These strategies are consistent with physiotherapy best practice: Stojanovic et al. (2020) demonstrated that balance and core training lower reinjury risk in racket sports, while Song et al. (2023) confirmed the benefits of cryotherapy and hands-on interventions for restoring mobility and preparing for training. In the case

of KSS and MFG, integrating these therapies into sport-specific drills was critical to ensuring both immediate relief and sustained functional performance (Bahr & Krosshaug, 2015).

Theme 3 — Rehabilitation and Return-to-Play (RTP) Decision-Making

The interviews highlighted the value of recovery prioritization, delayed return-to-play, and rehabilitation monitoring. For instance, the athletes described deliberately withdrawing from certain tournaments to avoid long-term setbacks and extending rehabilitation cycles when RTP criteria were not yet met. This aligns with Arundale et al. (2018), who emphasized that RTP decisions should rely on functional readiness rather than fixed timelines. Furthermore, Creighton et al. (2010) warned that premature RTP significantly increases reinjury risk—an outcome that the athletes sought to prevent through their cautious approach.

Integrating the Three Themes

Collectively, these themes illustrate that managing injuries in elite badminton requires more than treating physical symptoms (Kaldau et al., 2021). Chronic shoulder pain calls for sustained load management, while back strain and ankle instability benefit from targeted therapy and balance-based interventions (Zhang et al., 2023). Equally, the athletes' willingness to delay competition and prioritize recovery highlights the psychological and strategic dimensions of rehabilitation (Valldecabres et al., 2020). This integration supports holistic models of sports injury management that combine physical therapy, preventive training, and mental resilience (Sumantri & Ertanto, 2024).

CONCLUSION

This study demonstrates that managing sports injuries in elite badminton athletes requires an integrative approach that balances chronic symptom management, acute flare-up control, and strategic rehabilitation

planning. The experiences of Kevin Sanjaya Sukamuljo and Marcus Fernaldi Gideon highlight three critical aspects, the burden of chronic shoulder pain, back strain, and ankle instability, which restrict training and performance capacity; the role of manual therapy, cryotherapy, core strengthening, and balance training in restoring functional stability and preparing athletes for high-intensity play; and the effectiveness of recovery prioritization, delayed return-to-play, and rehabilitation monitoring in preventing reinjury and sustaining career longevity.

Importantly, the athletes' decisions to delay tournament participation and emphasize rehabilitation over immediate performance illustrate how progressive loading and strategic withdrawal safeguard long-term health. These insights stress that rehabilitation must be individualized, athlete-centered, and performance-specific, acknowledging both physical and psychological readiness.

From a practical standpoint, the findings offer valuable lessons for physiotherapists (to integrate manual therapy and functional conditioning), coaches (to adjust training loads with close monitoring), sports governing bodies such as BWF (to design schedules that minimize overload risk), and team management (to support athlete-centered recovery decisions). Collectively, this integrative model of injury management may guide safer return-to-play (RTP), enhance resilience against reinjury, and extend the competitive careers of elite badminton athletes.

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CONFLICT OF INTEREST

The author declares no conflicts of interest.

AUTHOR'S CONTRIBUTION

A.K. Ferdiantono were responsible for conceptualization, methodology, data collection, analysis, and writing. Bimantoro were responsible for data analysis.

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