

## CASE REPORT

# From Retirement to Return: A Sports Science Approach to Reviving an International Swimmer's Competitive Career – A Case Report

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### ABSTRACT

This case report examines the return of a 28-year-old retired swimmer to competitive sport through a multidisciplinary sports science approach. After retiring at 23 due to fatigue, the athlete sought to revive her career for personal achievement. A six-month periodized plan, divided into preparatory, transition, and competitive phases, was implemented to rebuild endurance, strength, and mental resilience. Key outcomes in six months included reductions in body mass index (28.42 to 23.4 kg/m<sup>2</sup>), improved strength (squat 1-repetition maximum (1RM) from 50 kg to 70 kg, bench press 1RM from 30 kg to 45 kg), and enhanced swimming performance (50m freestyle from 32.23 to 28.67, 100m freestyle from 1:18.23 to 1:04.96). The athlete's case report underscores the critical role of sports science in optimizing both physical and mental readiness for competition. Future research could explore the role of integrative sports science in optimizing the return-to-sport process for athletes from all disciplines.

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### INTRODUCTION

Reviving a retired athlete's competitive career is a complex process that goes beyond conventional training and requires integration of multiple disciplines of sports science such as physiology, biomechanics, psychology, and nutrition. Retirement often results in a decline in overall physical fitness and psychological hurdles such as fear of failure, which need to be addressed alongside injury prevention techniques. Understanding the reasons for retirement is critical to tailoring an optimal training plan that addresses specific needs. Athletes retire for various reasons, including career transitions, family commitments, or injuries, making retirement a significant transition requiring athletes to shift away from their athletic identity (1, 2). However, the desire for personal redemption and achievement often motivates athletes to make a comeback. Notable examples include swimmer Dara Torres, who made her comeback at 41, motivated by aspirations for greater success in her sports (3). Similarly, this case study explores the journey of a swimmer motivated by the same aspirations.

Retirement from high-performance sports can impact physical, mental, social, and occupational development, making the return to elite competition especially challenging (1, 2). Athletes must regain physical fitness while rebuilding the mental resilience and competitive edge essential for success (1, 2). Factors such as age, previous injuries, and time spent away from the sport must be carefully considered in developing a personalized training and rehabilitation plan (1, 2). Furthermore, psychological factors cannot be overlooked as athletes often grapple with self-doubt, making mental conditioning and motivational strategies crucial components of the comeback. A sports science approach combines multiple disciplines to enhance athletic performance, offering personalized training and nutrition programs to improve strength, endurance, technique, and physical fitness while minimizing injury risks (4). Periodized nutrition optimizes fuelling during different training phases, while psychological interventions such as mental toughness training enhance performance under pressure. Despite research on athletes' adaptation post-retirement, limited studies exist on returning to competitive sports post-retirement (1, 2). This study aims to explore the return of a 28-year-old international swimmer, emphasizing a multidisciplinary approach to ensure physical readiness and psychological well-being during the transition.

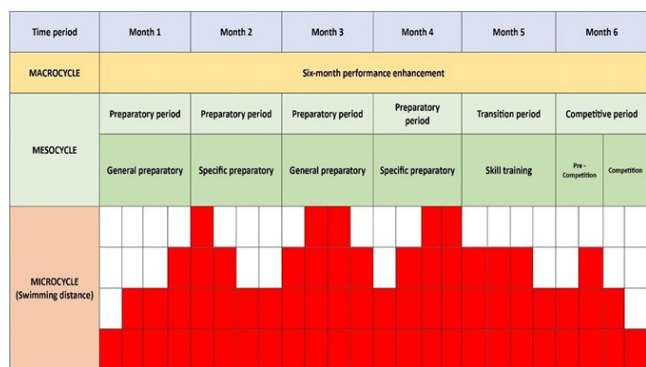
**CASE REPORT**

A 28-year-old female former international swimmer sought performance enhancement advice at Saveetha Medical College. Having retired five years earlier due to mental fatigue, physical exhaustion, and the pursuit of other interests, she expressed a desire to return to competitive swimming. The athlete had an illustrious career, beginning competitive swimming at age five and securing her first national medal at nine. By 13, she had won a national championship and qualified for international competitions, continuing to compete until her retirement at 23. Throughout her career, she trained rigorously, averaging ten swimming sessions weekly, each lasting 150–180 minutes, alongside five weekly strength and conditioning sessions. She followed a high-protein diet curated by a nutritionist.

Post-retirement, she maintained regular fitness activities four days a week, performing home-based aerobic exercises and bodyweight training. Her medical history revealed no illnesses or surgeries, and a thorough physical examination indicated no limitations to resuming sports participation. With a six-month competition timeline, a holistic approach based on sports science research was undertaken, culminating in a structured periodized training plan to optimize performance and recovery.

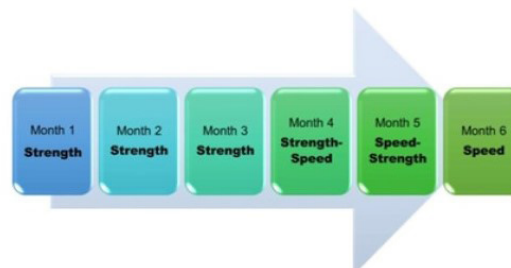
The six-month plan divided training into three mesocycles: preparatory (months 1–4), transition (month 5), and competitive (month 6) (Fig. 1). Each mesocycle featured microcycles varying in intensity and volume. Swimming training consisted of eight weekly sessions with breaks after every three sessions. Initial swimming distances were under 1,500 meters, progressively increasing over time. Strength and conditioning sessions complemented swim training, focusing initially on endurance and gradually transitioning to sport-specific strength and power.

During the preparatory phase, swimming sessions focused on long aerobic sets of 3,000–4,000 meters, rebuilding cardiovascular endurance and strength. Strength training emphasized compound and bodyweight exercises to rebuild foundational strength. In the second half of this



**Figure 1: Six-month training program of the swimmer**

phase, swimming volume increased to 4,000–5,000 meters, incorporating technique drills and anaerobic conditioning for explosive power. Strength training shifted toward maximal strength and power, with plyometric exercises introduced to improve strength-to-power conversion. The transition phase reduced swimming volume to 2,000-3,000 meters per session, emphasizing race simulations and skill refinement. Strength sessions decreased to two to three per week, focusing on maintenance and mobility. The final competitive phase prioritized sprint intervals and race-specific readiness while minimizing training volume for optimal recovery and peak performance. The overall plan of her strength and condition training program is given in Fig. 2.



**Figure 2: Six-month strength and conditioning plan for the swimmer.**

The athlete’s diet was tailored to training demands, adjusting macronutrient ratios across phases. During the preparatory phase, she consumed a balanced diet of 40% carbohydrates, 40% protein, and 20% fats, with protein intake set at 1.6 g/kg of body weight daily. Supplements, including multivitamins, omega-3 fatty acids, and whey protein isolate, supported recovery. In the specific preparatory phase, protein intake increased to 45% to support muscle repair, while carbohydrate intake reduced to 35%. During the competitive phase, carbohydrate intake increased to 60% to maximize glycogen stores. This nutritional strategy supported rigorous training and optimized performance.

Psychological training was integrated throughout to build mental toughness and manage performance anxiety. Techniques such as goal-setting, visualization, mindfulness, and relaxation exercises kept the athlete focused and motivated. The competitive phase included pre-race visualization and positive self-talk to manage stress and enhance focus.

The six-month plan yielded significant improvements in physical conditioning and performance. The athlete’s BMI decreased from 28.42 to 23.4 kg/m<sup>2</sup>, reflecting enhanced body composition. Strength gains were notable, with her squat 1RM increasing from 50 kg to 70 kg and bench press 1RM from 30 kg to 45 kg. These improvements translated into better swimming performance, with her 50-meter freestyle time reducing from 32.23 seconds to 28.67 seconds and her 100-meter

freestyle time from 1:18.23 to 1:04.96 (Table 1). She experienced no injuries, and self-reported benefits included improved confidence and satisfaction with the training program.

## DISCUSSION

This case study highlights the success of a structured, multidisciplinary approach in facilitating the return of a retired international swimmer to competitive sport. The significant improvements in body composition, strength, and swimming performance underscore the efficacy of periodized training (5). These findings align with studies demonstrating the effectiveness of structured programs in rebuilding endurance, strength, and anaerobic capacity. Research supports the role of strength training in enhancing swimming performance, particularly for sprint events (5). Moreover, the psychological interventions addressed self-doubt and enhanced competitive focus, highlighting their critical role in the athlete's comeback.

The tailored approach included elements such as polarized swimming training, dryland strength programs, periodized nutrition, and mental conditioning, all contributing to the athlete's readiness for competition. Tapering strategies during the transition phase facilitated optimal recovery and peak performance, as supported by existing research. This case underscores the potential for retired athletes to successfully return to elite competition through a comprehensive, scientifically guided plan.

## CONCLUSION

This case demonstrates the effectiveness of a multidisciplinary approach in facilitating the return of a 28-year-old retired international swimmer to competitive sport. Through a six-month periodized plan, the athlete achieved significant improvements in body composition, strength, and swimming performance. The success of this program highlights the importance of integrating strength and conditioning, tailored nutrition, and psychological training. Future research should explore similar approaches across different sports and athlete demographics.

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**Table 1: Swimming performance during the six-month period**

Time period	End of Month 1	End of Month 2	End of Month 3	End of Month 4	End of Month 5	End of Month 6
50-meter freestyle	32.23	31.84	31.11	30.91	29.45	28.67
100-meters freestyle	1.18.23	1.14.56	1.12.90	1.08.45	1.07.04	1.04.96

**Notes:** All timings are recorded in minutes, seconds, and milliseconds. For example, "1:18.23" represents 1 minute, 18 seconds, and 23 milliseconds, while "32.23" represents 32 seconds and 23 milliseconds.