

# Case Studies in Sport Science and Medicine

Edited by:

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Mike Loosemore, and Gregory P. Whyte

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### **Acknowledgements**

The four editors have an accumulated experience of over 100 years in applied sport science and medicine and have been discussing the idea of producing a book that highlights the importance of an individualized, case-by-case approach to optimizing health and performance of athletes and been doing so for some time. The plan was to gain insight into best practice and provide information on elite athlete support from those with first-hand experience and so we contacted the world's leading practitioners and researchers in sport science and medicine to see if they would like to contribute a chapter or comment on a chapter. The production of this book has come about by the fabulous people who have shared their ideas and work at the coal-face of elite sport. The book has been several years brewing and has presented substantial challenges in bringing it to fruition. It is therefore, extremely pleasing to be able to thank all the contributors in public for their unbending support.

Producing a book of so many chapters with contributors from across the globe, from Asia to America and from Western Europe to Eastern Europe, is no small task.

The editors would like to thank Jake Lane for his fantastic work in helping put the book together.

We hope you enjoy the book.

Richard Godfrey, Andy Lane, Mike Loosemore and Greg Whyte.

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Richard Godfrey worked for 12 years as a physiologist at the British Olympic Medical Centre (BOMC), the last 7 years as Chief Physiologist. He was involved in organising physiology service provision to elite sport before the home-country sports institutes, including the English Institute of Sport, were operational. He has staffed over 130 elite athlete training camps, worked with around 28 different sports in the lab and the field and provided support at many competitions, including numerous World Championships and three Olympic Games. Richard's main research interests include physiology of

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## INTRODUCTION

A psychologist meets with an endurance athlete who reports that she is finding training hard, feels she gets tired too quickly and feels she has to stop. The athlete describes a training session where this occurred and it's clear that she is sensitive to physical changes in her body that occur when exercising. When she starts exercising, a warning system that comes in the form of a voice in the back of her mind giving a message of "hold on, we need to be careful here....hold on.....this seems demanding, I need to slow down"...

What should the psychologist do? Start working on trying to control that inner voice? That is certainly an option. However, the client gives more information on her recent medical history, her training, and her diet. It emerges that she has had an injury that influenced her performance over the previous 12 months, and whilst she thinks it has cleared up, she also acknowledges that she wished she sought help earlier. As the client describes her training programme, diet, and sleep patterns and alarm bells start to ring in the psychologist's mind. It's clear that this is an issue routed in a number of different disciplines. At this point, the psychologist pauses to reflect and consider how to proceed. The psychologist ponders over questions such as; "I wonder what help would be offered if she saw a physiologist and they discussed her training, or what a nutritionist might say about her, or what a physician might say about her injury".

How fellow professionals approached this case would be interesting. In terms of practice, it is common for an athlete to see someone from one discipline and then go onto to see a practitioner from a different discipline. The psychologist could ask themselves "if she went to a physiologist first, how might that affect what I would do, and how I might work?" Practitioners working in sport and exercise science and medicine encounter cases like this frequently. Whilst research provides evidence based upon the mean response of a group of athletes to a given intervention; an individualised approach for a population of N=1 is required to optimise outcome. Each case will be different and require a solution that fits the assessment. How might someone learn the skills and knowledge to do such a task? This book, *Case studies in Applied Sport Science and Medicine* was developed to help fulfil this need.

There has been a need for a book such as *Case studies in Applied Sport Science and Medicine* for some time. Applied Sport Science and Medicine has become an integral part of the high-performance environment in recent years despite the relative youth of the discipline. Early work in sport science and sports medicine attempted to adopt approaches employed in the established disciplines of science and medicine. There has been growing recognition that a multidisciplinary support team should act in an interdisciplinary manner to optimise their impact on health and performance. Athletes require information to be given in a user-friendly way and will tend to see issues in a holistic way, raising questions such as "what does this mean to me?" and "is my training going to produce the results when I want it to?"

Although the terms multidisciplinary and interdisciplinary have become part of normal parlance in the support environment, very few teams provide a truly interdisciplinary approach. This is not criticism of professionals or an excessively bold claim, but recognition of the fact that sport and exercise science and medicine has placed emphasis in its research and practice on developing subject-specific experts, such as sport psychologists, physiologists, and so on. Indeed, the perceived complexity of interdisciplinary support has resulted in many practitioners simply not knowing how an interdisciplinary approach should operate, or even could operate.

Central to the development of a high-quality sport science and medicine support service is the shared understanding of the role of practitioners from different fields. It is not enough to be an expert in your own field; you must be knowledgeable about all aspects of sport science and medicine support and understand how best to utilise the expertise of others to optimise performance. The transferability of knowledge across disciplines is the key to success. Much like the relationship between coach and support staff, the transfer of knowledge is not a one-way process. The ability to explain your discipline-specific work to others is as important as their ability to articulate their intervention. Practitioners, coaches and athletes need to move closer together as a unit in order to enhance knowledge and practice, and develop as a team. Few resources exist to support this transferability of knowledge across disciplines; *Case Studies in Sport Science and Medicine* provides examples of how world-leading practitioners accomplish this complex aspect of support.

We divided the book into three sections.

1. The Reactive Model: Providing solutions for pre-existing problems
2. The Predictive Model: Providing solutions for events that are predicted to occur
3. The Proactive Model: Providing on-going support and developing interdisciplinary teams

In the first section we look at how practitioners work with pre-existing issues. It is common for practitioners to work with clients with issues that have been diagnosed and identified. In many ways, this is the “textbook” approach as it allows the practitioner to do some research on the issue, find out the latest research and then consider whether to use in her or his practice. However, the nature of applied work means that each case is unique and the application of one treatment to what can initially look like a similar condition can throw up a plethora of unknowns and a number of “ifs and “buts.” The take-home message is that the treatment presented by the practitioner is very different to what it looks like in the manual; or it can be. This section of the book illustrates this issue and brings some world-leading practitioners to the table.

The second section focuses on a number of themes in which the future competitive environment is known and so can be planned for. These include preparing to cope with the rigours of extreme climates, preparing for success in multiple events at one competition, addressing training either to boost performance or prevent injury and addressing the challenge of optimal hydration and nutrition. Without appropriate planning for “any and all” eventualities, preparation is suboptimal and there are greater risks than that the athlete will not perform to his or her best. The World’s best athletes and their coaches in any given sport have two major things in common: the best athletes are all very similar in terms of anatomy and physiology and the best coaches are excellent organisers, managers and strategists. So in preparing for anything at the elite level (competition or training) ‘leave no stone unturned’ is the all-important mantra. To achieve this, the requirement for expertise has grown as there is greater need for more and more accurate assessment and interpretation of the specialised sports science and medicine data that increasingly contributes to diminishing margins of success.

In the third section, we examine how sports scientists provide ongoing support. For example, a sports medic is working with the client, possibly listening to her or him describe the rehabilitation training from an injured knee. The consultant gets a hint that the client is struggling with the injury, and that rehabilitation is not being done at the intensity that it should be. The athlete appears to be saying what is expected rather what has happened. The sports medic wishes he had a sports science team sitting in residence in his mind, so she/he could address the issue from an interdisciplinary perspective. This section of the book works along those lines, detailing cases where practitioners are working in an interdisciplinary way and as such offers some fabulous insights into applied work.

In recognition of the need for a bespoke, individual tailored approach, this book examines examples of support from a case study perspective across the broad range of sport science and medicine disciplines written by recognised world leaders. This book provides 29 case studies covering physiology, psychology, biomechanics, motor control and performance analysis, nutrition, strength and conditioning and sports medicine. Each case study is presented in a structured format providing a vignette of the case with key information including the challenges faced. The vignette is followed by a contemporary review of the key literature in the field informing the decision-making process involved in the case study and related differential diagnoses and interventions. The case study is concluded by presenting the intervention and outcome. Each case study is followed by a commentary from another world leader drawing out salient points, expanding the discussion and giving personal insight.

Practitioners, athletes, students and anyone interested in sport should find the content of these case studies relevant and useful; they are diverse and capture the range of issues consultants face. Overall, *Case Studies in Sport Science and Medicine* offers a unique and valuable collection of case studies in a wide range of sport science and medicine disciplines written by world leaders in the field of high-performance sport for those working in the field of sports science and medicine.

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# **Part I: The Reactive Model: Providing solutions for pre- existing problems**

## CHAPTER 1

### **Sick and Tired of Being Sick and Tired: Case Study of an International Kayaker's Recovery from Chronic Fatigue Syndrome and Psychological Preparation for the World Championship**

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#### ***Vignette***

Psychological support was provided over a 15-year period spanning 1994-2008 to a Caucasian female, 6-time world champion and marathon kayaker. Throughout much of this period, she presented with symptoms associated with overtraining and unexplained underperformance (1), which culminated in a clinical diagnosis of chronic fatigue syndrome (CFS) in 2003 when she was 26 years old. Difficulties associated with diagnosis and treatment of CFS are well documented (2). The etiology of CFS remains inconclusive, laboratory markers are unreliable and an effective cure is elusive (3). Broader conceptualisations of CFS that view it as a biopsychosocial condition (4) or an adjustment disorder (5) have challenged the traditional conceptualisation of CFS as a biological imbalance caused by excessive training and/or inadequate recovery. Following two years of ineffective treatment, during which time one sports medicine specialist told her she may never race again and that her body was saying "it's time to hang up your paddles", the athlete eventually recovered in 2005 having followed a reverse therapy regimen (6). Reverse therapy treats CFS as a disorder of the hypothalamus-pituitary-adrenal axis and provides an educative process focusing on such things as the link between emotions and health, finding a balance between training load and life demands, and emphasising fun and lightness in her approach to training.

Mood disturbance is acknowledged as a common symptom in overuse conditions (7). Hence, mood profiling has been advocated as a useful monitoring tool for athletes generally (8) and for elite kayakers in particular (9). Mood scores for fatigue, vigour and depression have been shown to be particularly germane in this context (9,10). During the period of rehabilitation from CFS and in preparation for the 2005 world championship, music was used to regulate effort levels, control attentional focus, and generate specific emotional responses (11). Goal-setting exercises (12) were used to establish milestones for recovery, to provide a framework for her preparation for the world championship, and to clarify a specific race plan. Relaxation and guided imagery exercises (12) were used to mentally rehearse her race plan for the world championship, in which she made a successful return to competition at the highest level. These techniques were also applied to helping her manage non-sport stressors with a view to maintaining a robust sense of self-esteem that was founded on her qualities as a person and her life beyond sport.

#### ***Discussion***

This case raises issues concerning (a) the almost inevitable tension between performance demands and athlete health, (b) coaching practices and athlete well-being, and (c) medical and psychological support for athletes. Her coach was a very experienced, highly successful practitioner who, while sensitive to her vulnerability to overuse conditions, based his program on high training volume even by the demanding standards of marathon kayaking. In hindsight, the training demands made in the name of performance enhancement may not have been conducive to her physical health and psychological well-being. This observation should not be interpreted as criticism of the coach, whom I would describe as a hard-driving but caring taskmaster. Instead, it points to the need to include regular input from health professionals who place athlete well-being as their highest priority while recognising the difficult balancing act required of coaches to achieve the maximum training effect for athletes but not burning them out in the process.

During the two-year period that she spent fighting the debilitating effects of CFS, telephone counselling was provided on a regular basis. Given her persistent fatigue and susceptibility to recurrent infections, her emotional state for much of this period was one of confusion with moments of despair, although no clinical depression was diagnosed. Although the inter-individual variability of a spectrum of symptoms for CFS is acknowledged (1), concomitant individualisation of treatment plans does not necessarily occur. Frustration at prolonged lack of progress via conventional medicine caused her to seek alternative treatment, including acupuncture, hypnotherapy, crystal therapy and spiritual healing. After suffering, as

she described it, “15 months of terror and error”, she embarked on a course of reverse therapy (6) which helped her overcome the illness.

In an account of her struggle with CFS (13), she recalls how the same personal strengths that helped her become world champion – commitment, single-mindedness, focus, dedication – had contributed to the demise of her health. Her vigilance, bordering on obsession, in always doing the right thing in training, diet, sleep patterns and so on, drained her happiness and love of kayaking to the point where she felt permanently exhausted. During her lowest moments, lying on her bed in tears, she gained much from mental imagery. “I’d visualise a race course, see myself on the start line, picture my rivals and see the race unfold. I’d see everything; I’d imagine the weather, but I wouldn’t just see it. If it was raining, I would feel the rain on my skin and feel the wind in my face. I used all my senses. And of course I’d always win ... It was very powerful; not only did it inspire me and cheer me up but also I was creating movies in my mind that I would use when I was racing again”.

In the 2005 world championship, held in Perth, Australia, women completed 4 laps of a 7.2 kms course, punctuated by 4 portages where they ran 200 m overland carrying their kayaks before re-entering the water to continue paddling. The athlete was renowned for her fast portages and accordingly she based her race plan on stay quietly on pace with the leading pack, running very hard at the final portage and then burning (making a sustained effort) over the next 4 minutes. Plan A was that she would drop all her competitors at that stage, leaving them to fight for the minor placings. Plan B was to beat her rivals in a sprint finish as she had done previously in the European championship. Plan A relied on feeling good coming to the final portage whereas Plan B was seen as higher risk due to the relatively unknown sprinting capacity of some of her rivals. Commitment to Plan A grew in the 48 hours preceding the race, reinforced by regular mental rehearsal of her performance of the decisive portage.

Using rational-emotive behaviour therapy (14) incorporating a solution-focused approach (15), many of her anxieties about the forthcoming race were challenged. These included doubts about her physical condition, her ability to reproduce past form and, in particular, whether she would “seize up” during the race as she had experienced several times in training. During frequent discussions about her race plan, which had already been endorsed by her coach, several messages of confidence were drip fed, including that she was the most experienced competitor, the best tactician, the one they all feared, the one with the record of winning, the one who wanted it the most, and that no one could drop her and no one was more determined.

The athlete’s mood responses were monitored using the Brunel Mood Scale (16). Figure 1 shows her mood profiles leading into the world championship. Profiles demonstrate increasing vigour and decreasing fatigue; which from her previous mood profiles were known to be positive indicators for this athlete. Depressed mood and anger remained stable at minimum levels. Confusion was eliminated as race day came around due largely to her race plan becoming more clearly understood and well rehearsed. Tension fluctuated but remained within the normal range for athletes, considering the importance of the event. Overall, her pre-race mood profile was consistent with theoretical predictions of excellent performance (8) and with optimal mood profiles associated with her previous successful performances.

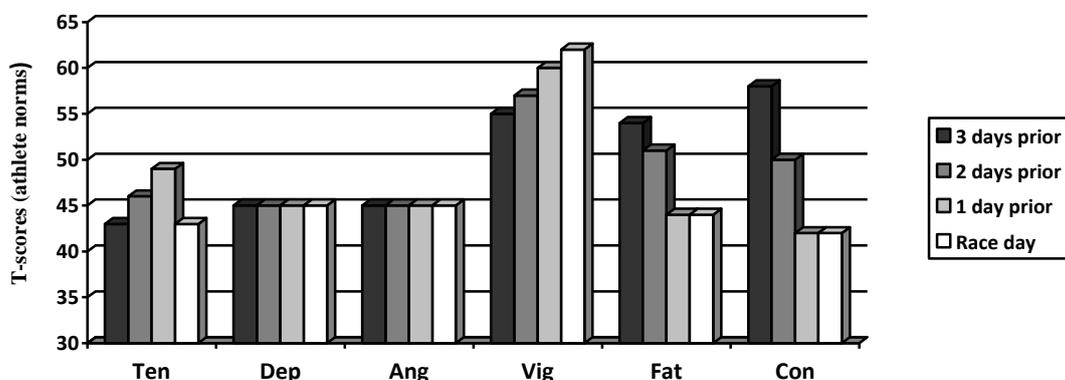


Figure 1. Mood profiles demonstrating mood enhancement leading into the world championship

As for music interventions, during her period of rehabilitation from CFS and in preparation for the world championship, the athlete used different songs for different purposes. While training on-water wearing sunglasses with a built-in mp3 player, she used Nelly Furtado's *I'm Like a Bird* to (a) regulate her stroke rate by matching it to the tempo of the song, (b) generate feelings of being relaxed and free, and (c) reinforce the metaphor of learning to "fly" again following her debilitating condition. She used songs such as *Happy Face* (Destiny's Child) and *Rise Up* (Yves Larock) to feel uplifted and happy, and the theme from the *Rocky* movies when motivation began to wane. R. Kelly's *World's Greatest*, the theme song from the movie *Ali*, was reserved for race day. In her words, "I absolutely love the lyrics. I save this song for the really big races. I only ever listen to it at the world championships when I am warming up for my race. It brings a lump to my throat; it puts me in the zone"

### Conclusions

In this case, conventional medical approaches were ineffective in treating CFS whereas an alternative approach, reverse therapy, proved efficacious. Although reverse therapy is based on established neuroscientific principles, the evidence base for its efficacy is not well established empirically. Further evaluative research is therefore warranted. Feedback from the athlete supported use of a range of sport psychology strategies, including mood profiling, goal-setting, imagery, and music interventions. Meta-analytic summaries of the research literature (17-20) have strengthened the evidence base for such techniques. The weighted mean effect sizes in these meta-analyses indicate robust benefits to performance and/or psychological well-being in the small-to-moderate range for goal-setting (17), music interventions (18) and mood profiling (19), and in the moderate range for imagery (20). The present case study has highlighted the benefits of a multidisciplinary approach to supporting athletes' health needs and emphasises the potential efficacy of alternative medical approaches.

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**Commentary:** *Chris Beedie*, University of Aberystwyth, UK

Peter Terry's case study describes one of a group of sports-related illnesses, including overtraining syndrome and burnout, which whilst historically conceived as physiological conditions, likely have as much in common with mental health syndromes, specifically mood disorders. In many respects, the situation Peter describes, that of an endurance athlete who is trapped in a cycle of increasing efforts and diminishing returns, is not unusual. However, in this case, the athlete herself suggests that the very traits and behaviours she associated with elite performance, for example, dedication, focus and commitment, contributed to a substantial worsening of her health.

The mentality of elite performers is often almost dualistic, one of the self and the body as separate entities, with the self being able to drive the body towards ever better functioning, the brain essentially serving to program one's body. The reality of course is that the 'self' is a function of mind, which is itself a function of the brain. To function properly, the brain is dependent on the same physiological processes as are the heart, and the musculo-skeletal and cardio-respiratory systems. Therefore, when physiological processes break down, the self is as at risk as the body.

Peter Terry, recognising the totality of the condition, as well as the potential impact of a broad range of factors in its genesis, employs a long-term, multi-modal and multi-phase approach to treatment. He incorporates interventions from traditional cognitive-behavioural approaches such as goal setting and imagery, through to the use of music as both a symbolic and emotive self-regulation mechanism during training and prior to performance. Music in this respect is not a proxy; music is part of the therapy. Significantly, Peter's approach is one in which the psychological skills developed by the athlete during the process were as much applicable to the athlete's life beyond sport as to the immediate competitive environment. No doubt these skills were likely essential factors in both her journey through illness and the return to the status quo, free of these problems.

Peter Terry suggests that his case study raises issues concerning "the almost inevitable tension between performance demands and athlete health", suggesting a potential clash between performance and well being interests. The physical and mental health of an elite athlete in a period of intense or important competition often rests on a knife edge; a move away from the edge in one direction might represent improved physical and mental health and an oasis of calm, but below-par sports performance, and an athlete (and coach) would likely be motivated to avoid such a scenario. However, a slight move from the edge in the other direction might represent a substantial deterioration in that athlete's ability to function, both within and beyond sport, and the athlete could find themselves in dire straits. Within the highly charged sport environment, this type of deterioration is all too often addressed in the context of sports performance, and strategies aimed at reversing such a decline are often counter-productive leading to further declines. As Peter suggests, such a situation calls for the intervention of a health professional, and not a rush by the coach to police the athletes's training load in an attempt to get performance back on track in a blur of sport-related activity.

Peter's account highlights the increasingly evident role of mood measurement in the evaluation of athletes. Peter suggests that mood disturbance is a symptom in overuse conditions. This argument could be extended to stating that mood might in fact be an evolved signal of that developing condition, a process that functions to tell us, and others, that our resources are low. Interestingly, the mood measures Peter used, often used as predictors of performance in sports research, were initially developed as a measure of mood disorder in clinical psychiatry.

The case study described by Peter Terry leaves one in no doubt that, ultimately, his focus on a range of broad issues including sport, was ultimately a more effective sports psychology intervention than would have been the case had he adopted a narrow focus on performance issues alone. It highlights the need for sports practitioners to understand the complex interaction of biological, psychological and sociological processes in maintaining both elite performance and the optimal mental and physical health of athletes, or in suggesting the cure for any such condition as that described.

of inhaled corticosteroids on exercise performance in asthmatic participants. They demonstrated 6 weeks of low dose of inhaled corticosteroids resulted in a 74% improvement in running time to exhaustion, which was accompanied by increases in oxygen consumption, oxygen blood saturation and blood pH. The participants in this study were not elite athletes and they suffered from asthma, as opposed to EIB. However, the study would suggest that treating athletes with inhaled corticosteroids will lead to performance gains. Just how much is difficult to predict as it will depend on the individual, severity of their EIB, and sport they are involved in. Detection of EIB and appropriate treatment gives the athlete every opportunity to maximise their potential in their chosen sport. The reverse can be said in those athletes who remain un-diagnosed and/or sub-optimally treated.

In this particular case study, the swimmer was only tested for EIB once her symptoms became a limiting factor to her training. As mentioned by the authors of the case study, symptoms alone are often inaccurate to pose a diagnosis of EIB in elite athletes (2). It was good practice in this case to perform an indirect airway challenge, such as EVH, to confirm the presence of EIB. It is however, not uncommon for symptomatic athletes (with or without a history of EIB) to have a negative response to indirect airway challenges. In these 'negative' athletes for EIB, a common subsequent diagnosis is inspiratory stridor and/or dysfunctional breathing during high-intensity exercise. There are non-pharmacological treatment strategies that can be used to assist these athletes (3) who would otherwise be prescribed inhaled  $\beta_2$ -agonists to no benefit.

It is well known that many elite athlete compete at international levels of competition without realising they have EIB (4). Therefore, it has been recommended that, where possible, athletes are screened for EIB (5). The screening should involve an appropriate indirect airway challenge test, along with a prior check of previous medical/family history of asthma and, where possible, an assessment of airway inflammation. Follow-up assessments in pharmacologically treated athletes are also worthwhile to examine the attenuation of airway inflammation and bronchoconstriction post-treatment.

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# **Part II: The Predictive Model: Providing solutions for events predicted to occur**

## CHAPTER 13

**Live high (2000m), Train low (1050m) in Short-track Speed-skating.***Charles Pedlar*

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***Vignette***

In 2004, prior to the 2006 Winter Olympic Games in Torino, Italy, the Great Britain short-track speedskating team ( $n = 9$  male, 2 female; mean  $\pm$  *s.d.*; age:  $20.2 \pm 2.2$  years; body mass:  $70.7 \pm 7.2$  kg) explored the potential to conduct a training camp at moderate altitude with the aim of enhancing sea level performance and a view to including altitude training in their Olympic preparation. The period of 'altitude' exposure included 8 days of training at a moderate intensity in a normobaric hypoxic environment ( $F_{I}O_2 = 0.143$ , 75 mins·day<sup>-1</sup>, 8 days) at the national training centre in Nottingham, UK, followed by 14 days of living in Bormio, Italy at 2000m (total period 22 days). Whilst some training was undertaken at 2000m and above during this period, daily skating training was completed at 1050m (~ 90 mins·day<sup>-1</sup> variable intensity). The skaters lived in close proximity, with 2 or 3 skaters to each hotel room. Data collected were examined as a group and on an individual basis by a team of sports science and coaching staff in order to judge the overall benefits of altitude training for this squad prior to the 2006 Winter Olympic Games. The head coach to plan the allocation of funding for training camps, at least 2 years prior to the Games, used results.

***Discussion***

The duration of Olympic short-track speed skating events (longest event: 5000m relay: ~ 7 mins, shortest event 500m sprint: ~ 45 seconds) require skaters to be both aerobically and anaerobically efficient (1). Furthermore, the nature of the sport, particularly the tight bends skated at high velocity, requires skaters to hold a position which demands a high level of postural strength in a 'sitting' position. This 'sitting' position can lead to reduced asymmetric oxygen delivery and extraction, and a higher accumulation of blood lactate, possibly due to a reduced blood flow to the legs (2).

A number of studies have demonstrated that training at moderate altitude (1,500 – 3,000m above sea level) can improve oxygen uptake, transport, and delivery at sea level (3). This occurs through a number of mechanisms, potentially the most important being an augmented erythropoiesis, resulting in increased total haemoglobin mass (tHbmass)(4). Training at moderate altitude reduces maximum oxygen uptake and therefore oxygen flux during high intensity exercise and this can result in some detraining. A 'Live-high, train-low' strategy combats this problem because high-intensity training is conducted at a lower altitude where a higher oxygen flux can be achieved (5). Moreover, short-track speed skating performance is influenced by moderate altitude, due to the effect of the reduced air density on ice conditions (6) and on aerodynamic drag during skating (7) resulting in faster skating velocities. Anecdotally, skaters above 1000m altitudes commonly report 'faster ice'. Thus, living and training at altitude may be beneficial for, and is widely used by speed skaters, either for improved training quality or for the potential benefits of acclimatisation to altitude upon aerobic and anaerobic energy production (5, 8).

Amongst the range of deleterious effects of short altitude sojourns, two main candidates are poor sleep and inadequate recovery. Residence at moderate altitude or simulated altitude has been shown to cause sleep disruption in some individuals (9,10,11), therefore, there is a possibility that recovery from training may be hindered at altitude while acclimatisation takes place. It is important, therefore, to balance the potential gains from altitude training (5) against the potential lack of adequate recovery due to sleep loss. Furthermore, sleep deprivation reduces daytime function (12) and increases the potential for illness (13) which we seen collectively can further reduce the overall quality of training and the overall risk of maladaptation to altitude training (14).



Speed skating race. Photo courtesy of Charles Pedlar.

### ***Intervention***

In order to assess the impact of a 2-week altitude training camp, a range of positive outcome indicators were identified guided by theory and research that was available in the literature in 2004. These indicators included haematological parameters and measures of speed skating performance. In order to assess the potentially negative effects of altitude training, sleep quality and iron status were monitored. Routine measurements were taken daily during the training camp including urine osmolality, mood (Profile of Mood States), bodyweight, resting heart rate, blood pressure, peripheral oxygen saturation, and blood urea. These variables were examined collectively in order to assess signs of overreaching and illness (15) as well as altitude acclimatization, and were used by the coaches to monitor health and wellness and to make small adjustments to the training programme of the squad. Sub-maximal exercise tests were also regularly performed to monitor adjustment to the new training environment and individually adjust training programmes, particularly during the first week at altitude.

### ***Findings***

The majority of athletes suffered upper respiratory tract infections to varying degrees of severity during the altitude camp. These may have been caused by the additional stress of living at altitude, but it is equally plausible that the cause was non-altitude related, e.g. close living quarters, exposure to infectious agents during air travel etc.

*Sleep:* Sleep was monitored at baseline (7 nights prior to ascent to altitude) until 7 days after descent to sea level using wristwatch actigraphy, a non-intensive data collection method that measures movement and does not impact on the athlete in any way. In order to assess the group effects of altitude, data were grouped into four 7-day periods as follows: pre-camp at sea level (SL1), week 1 at altitude (ALT 1), week 2 at altitude (ALT 2) and post-camp (SL2). Disruption to sleep at altitude was observed on an individual level, for example, suppressed sleep efficiency (Figure 1) and lengthened sleep latency (Figure 2). Some of the sleep disruption may be attributable to other factors in the local environment, for example roommates; or an increased training load, however, it is likely that altitude played a role.

*Maximal performance:* Nine days before (RT1) and eight days after the altitude training camp (RT2), a maximal skating test was performed on the ice to measure skating performance (time to complete the test), maximum blood lactate concentration, and maximum heart rate. The test was discontinuous, involving 7 x 1.5 laps (166.68 m) of a standard short track; each skated at a maximal intensity. Between each 1.5 lap repetition, the skater cruised around the track, building up the speed for the next repetition over a period of 1 minute. This is a test regularly used by the team to measure performance, known as the 'Relay Test' and as such the skaters were well habituated to the demands of the test and the protocol. Performance time significantly improved ( $P < 0.05$ ) pre- to post-camp in all cases from  $108.5 \pm 3.3$  seconds to  $106.0 \pm 2.9$  seconds accompanied by trends towards lower mean heart rate and lower peak blood lactate concentrations. See Figure 3 for the spread of the performance improvement between individuals.

*Blood:* Venous blood samples were drawn and analysed locally. Evidence of accelerated erythropoiesis was observed with a trend towards higher circulating erythropoietin at altitude, which appeared to be at the cost of iron stores evidenced by a trend towards lower ferritin at altitude (see Figure 4). No measurements of tHbmass were taken which would have provided more definitive evidence of enhanced haemoglobin content and therefore aerobic capacity; however, over the relatively short altitude residence significant increases in tHbmass are unlikely to have occurred.

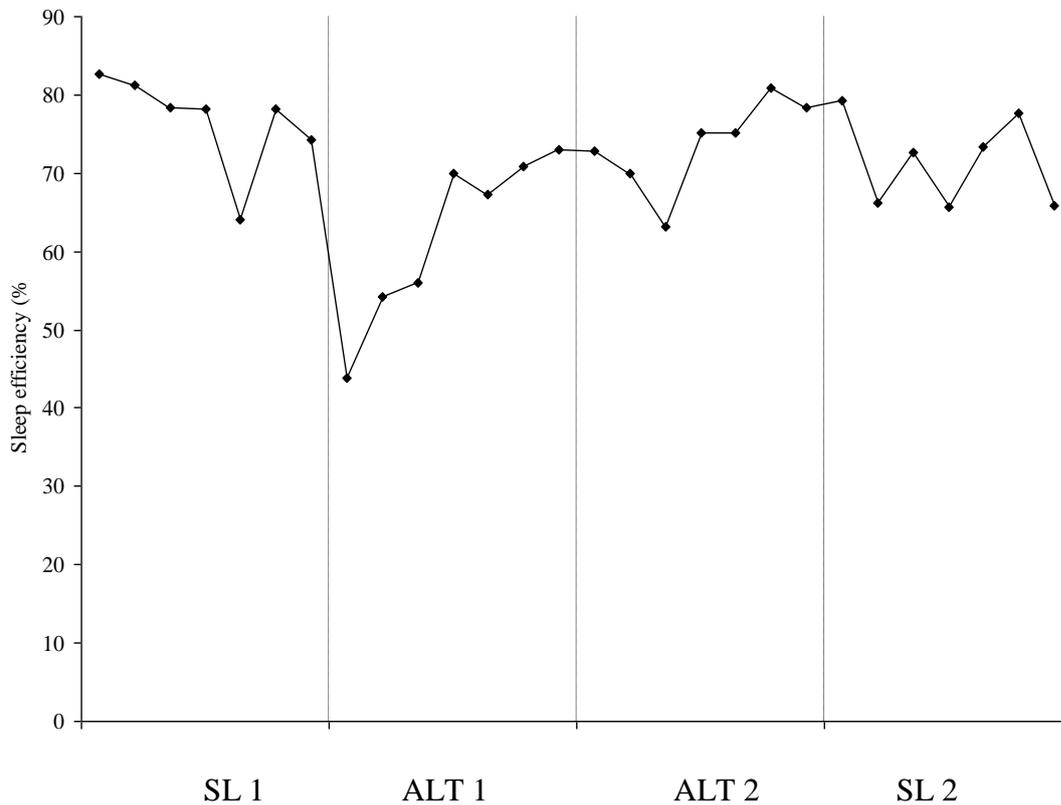


Figure 1: Sleep efficiency in one speed skater, where the lowest values were recorded during nights 1-3 at altitude, representing the worst quality sleep. The dashed vertical lines demarcate the 4 1-week periods SL1 = pre-camp week at sea level, ALT1 = week 1 at 2000m, ALT2 = week 2 at 2000m, SL2 = post-camp week at sea level.

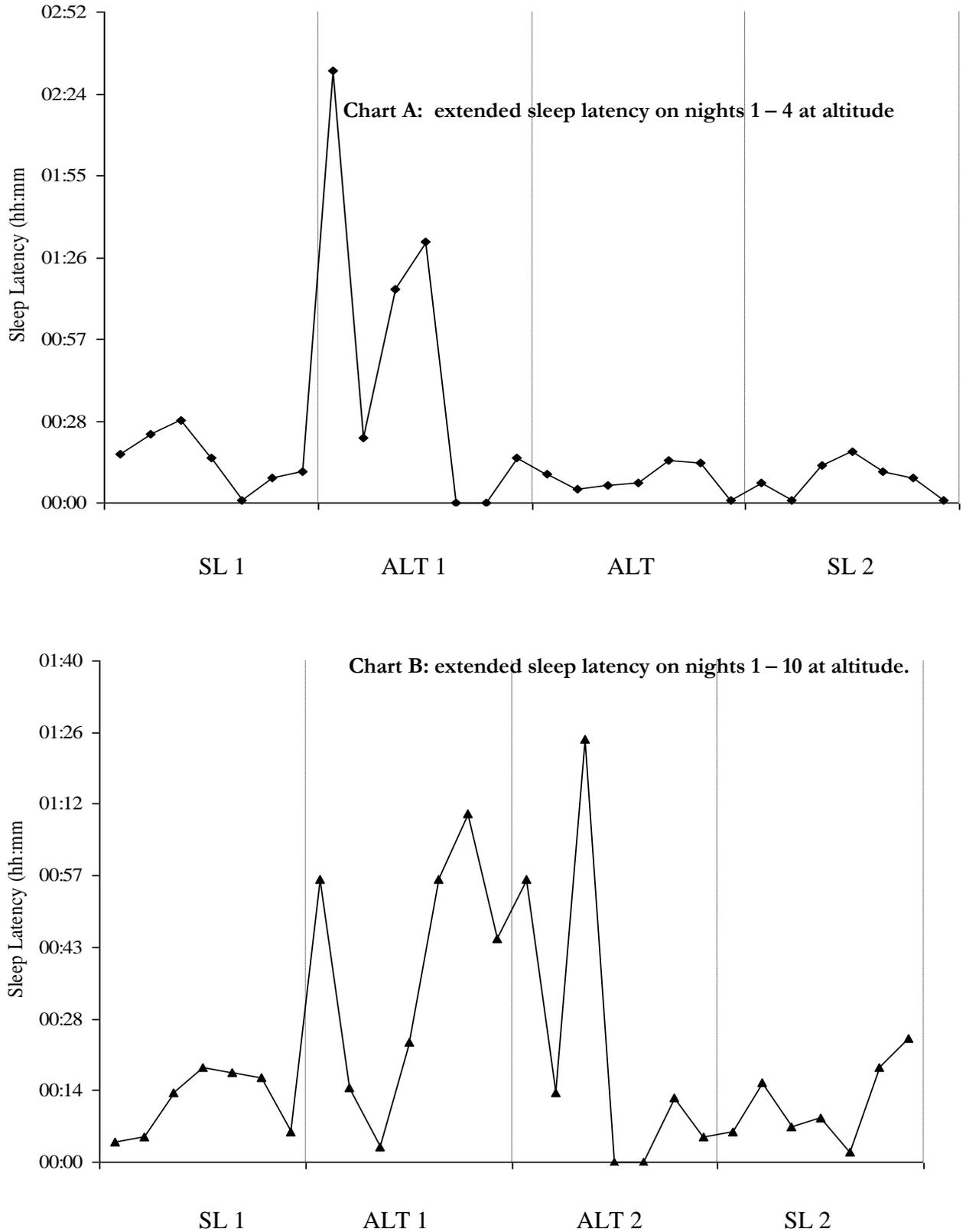


Figure 2: The impact of the altitude training camp upon sleep latency in two speed skaters. Chart A shows an extended sleep latency on nights 1 – 4 at altitude. Chart B shows extended sleep latency on nights 1 – 10 at altitude. The dashed vertical lines demark the 4 weeks SL1 = pre-camp week at sea level, ALT1 = week 1 at 2000m, ALT2 = week 2 at 2000m, SL2 = post-camp week at sea level.

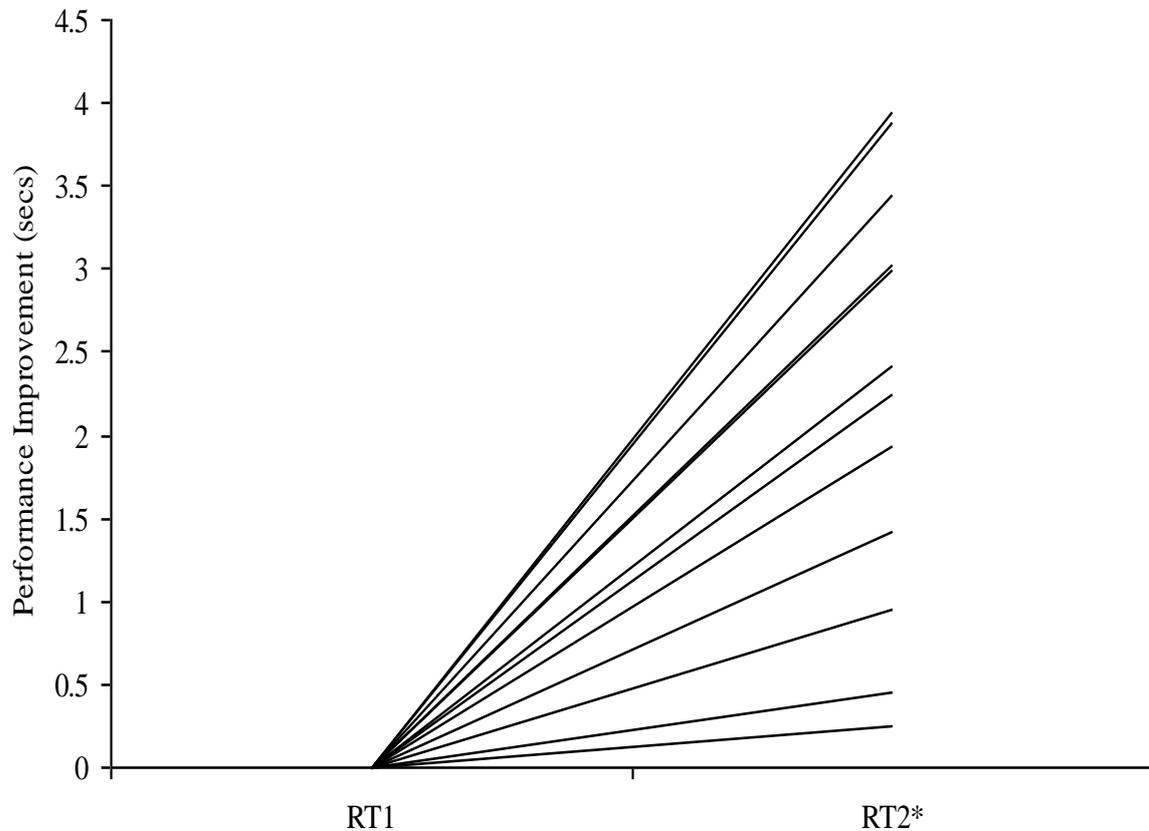


Figure 3: Absolute performance improvement in a maximal relay test comparing a test undertaken eight days before the altitude training camp (RT1) and eight days after the altitude training camp (RT2). \* denotes a significant difference between tests ( $P < 0.05$ ).

### **Conclusions**

The performance improvements observed in the present case study are similar to those observed in the published altitude training studies however; cause and effect cannot be stated here due to a lack of a control group (a common short-fall of altitude training studies).

Ultimately, the main outcome was that the coach made the decision not to employ a live high, train low strategy in the ensuing training and competition phases because he felt that whilst the intervention was not deemed to be a failure, the weight of positive evidence was not strong enough to adopt a longer term altitude strategy. The disruption caused to the training programme, the occurrence of upper respiratory tract infections and the negative impact on sleep quality coupled with a relatively small improvement in performance, did not justify the inclusion of altitude training in the immediate future.

This case study demonstrates the integration of objective physiological, performance and sleep behaviour data with coaching into an elite national squad, in order to plan a pre-Olympic strategy.

\*Please note that the individual opinions summarised in this case study are those recalled by the author and may not be the opinions of GB Speed skating staff

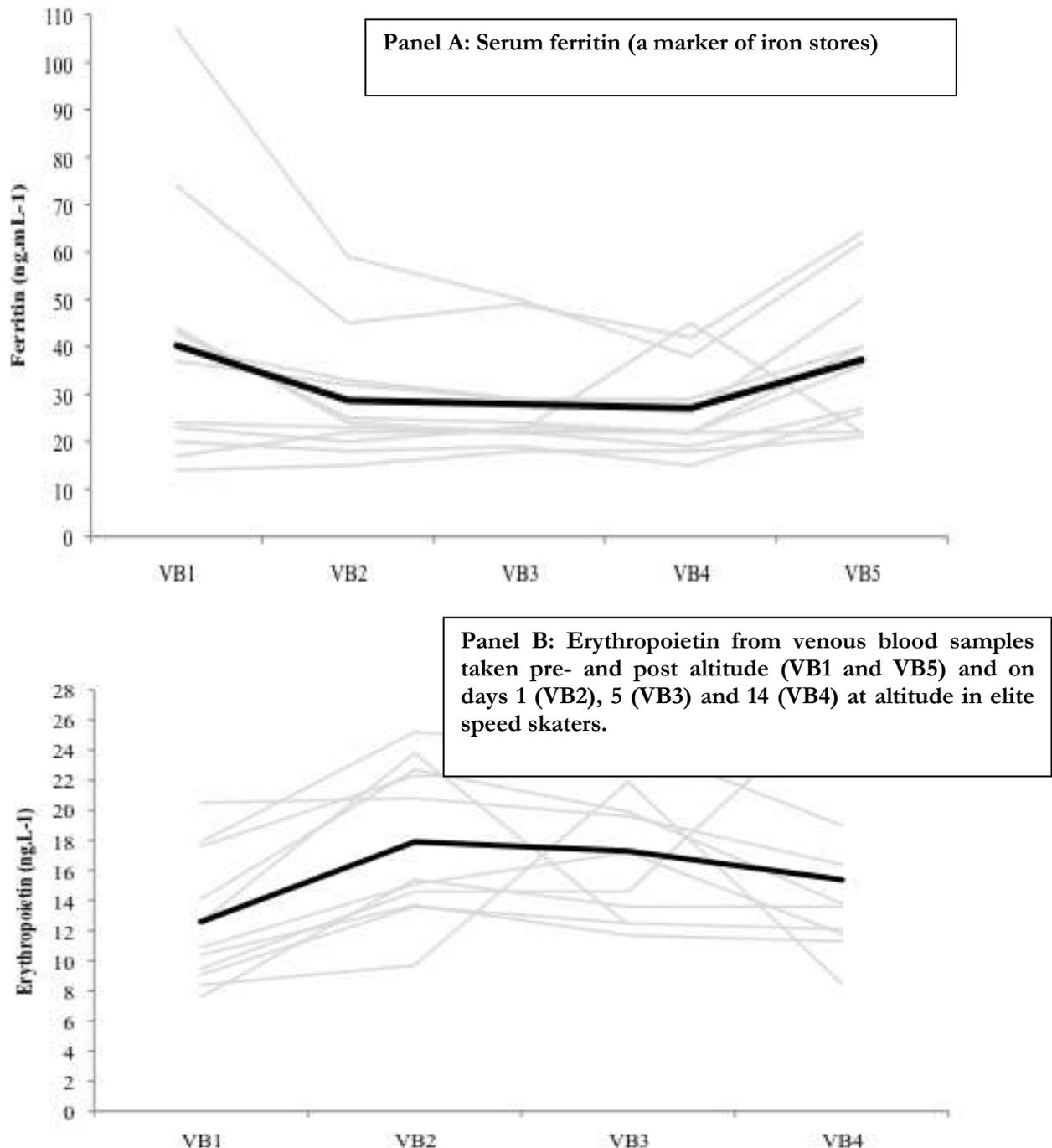


Figure 4: Panel A: Serum ferritin (a marker of iron stores) and Panel B: Erythropoietin from venous blood samples taken pre- and post altitude (VB1 and VB5) and on days 1 (VB2), 5 (VB3) and 14 (VB4) at altitude in elite speed skaters. The mean response (bold line) and individual responses (faded lines) are displayed.

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**Commentary:** Andy Lane and Tracey Devonport, University of Wolverhampton UK.

The case study presents a scenario that can occur many times in sport science support with elite athletes in that multiple factors influence performance and these factors fall outside of the skillset of a single sports scientist. In the case provided above, altitude is a factor associated with changes in a number of physiological states. Pedlar describes a package that proved effective in terms of eliciting desired physiological adaptation. However, undesired consequences were also observed in terms of upper respiratory tract infections and sleep disturbance. In commenting upon this case study, we began considering a number of other variables that could be considered in evaluating the pro's and con's of altitude training (and living) that would influence the process. One such factor is an athlete's self-confidence might deteriorate. When an individual exercises at altitude it feels harder for the reasons described in the case study above, and so the possibility that the athlete confidence deteriorates represents a real possibility. Self-confidence has been found to predict performance and inversely relates to unpleasant and unwanted emotions (1). It is the link between self-confidence and motivated behaviour that could be especially important here. Confidence predicts the persistence and intensity of effort in the face of adversity whereby people high in self-confidence persist for longer and harder (1). Therefore, if confidence deteriorates, and is followed by a reduction in the intensity of training, then the goal to improve performance will not be achieved.

At altitude, a physiologist might expect a reduction in the intensity and duration of sessions. The athlete will be informed that exercise at altitude should feel harder, but how will he or she know how to gauge whether he/she is working hard enough? Speed will be slower and indices such as heart rate and

breathing depth and frequency will be higher. The athlete will be acutely aware of this sensory feedback. A psychologist would aim to encourage athletes in his/her or her care to consider re-appraising symptoms of fatigue, and importantly, encourage ways of interpreting high heart rate scores as indicative of training intensity regardless of the likely fact that the speed achieved is slower. It is worth reflecting on the fact that worrying thoughts have been found to affect sleep and so clearly if an athlete believes he/she is not making progress at a training camp this will exacerbate the deleterious effects on sleep.

A suggestion to help an athlete prepare for an altitude training camp is to anticipate the likely stressors and have a solution prepared for this problem. Athletes, in particular, high-performance athletes, are acutely aware of the important role of sleep in the recovery process, and the consequences of upper respiratory tract infections for training outputs. An individual anticipating these as potential consequences of altitude training may experience negative thoughts towards altitude training. Should such thoughts remain unmanaged, then the potential consequences for confidence, training effort, engagement and interpretation of training outcomes may be undesired.

Research has found that a strategy called implementation intentions has been effective in coping with stress in a number of different areas including sport and health. Implementation intentions are formed as an "if-then" plan (2). The "if" part is the problem, for example, "if I notice my heart rate is unusually high for a 500m sprint" or "If I notice I feel out of breathe easily at altitude". The "then" aspect is the solution to the problem. Therefore, with regards to the present case study, the "then" aspect could be "I will tell myself not to worry about skating slower as the physiological adaptations are still taking place and these are positive". The athlete has to put the if-then component together so if I notice my heart rate is unusually high when running for a 500m sprint, then I will say to myself, not to worry about running more slowly as physiological adaptations are still taking place and these are positive". A benefit of if-then planning is its simplicity. The nature of an if-then plan is that the solution has been primed and so when the problem presents itself, the solution is the first thought that comes to mind. Furthermore, the simplicity of this type of intervention means that physiologists working in the field could utilise it. For example, it could be used to support athletes following instructions intended to accelerate adaptation to training at altitude.

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**Part III: The  
Proactive Model:  
Providing on-going  
support and  
developing  
interdisciplinary  
teams**

## CHAPTER 22

**Athlete Adaptation: A Comprehensive Approach to Intervention**

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***Vignette***

I was approached by a boxing management group to assist an athlete with his performance preparation. I knew the boxer (pseudonym name James) from his amateur sport career, where I assisted onsite when he performed successfully at several major games. After turning professional boxer, he was touted as the future of the company that signed him. The first 15 bouts were relatively easy for James given his talent, well-established boxing skills, and also the quality of his opponents. James, when faced with higher quality opponents, started to realize that there were aspects lacking in his performance; either he was not as good as he initially believed, or he lacked the structure to sustain a successful professional career. When I started meeting with James he was in conflict with his coaching and management staff, and in fact he was at a contractual standoff. At the core of the conflicts was self-doubt – James anticipated that he was not going to meet the expectations of his fan base, and those he worked with.

Schinke met with the athlete numerous times and also with those in his staff. Over the course of seven months of discussion, an adaptation intervention was employed. The first objective was for the athlete to *understand* where his fears originated and why he was under-achieving in performances. After much discussion on the part of the athlete and the SPC it became clear that James was placing far too much pressure on himself through interviews with the media. In addition, there was insufficient understanding of each opponent well in advance of bouts. Examples included a limited appreciation of the opponents' tactics throughout the bout, such as being a fast or slow starter, a counter-puncher, and the distance the opponents preferred to box from. Instead, the athlete relied on his talent and also his capacity to adjust in the ring. Adding to the complexities, James lacked *trust* in his staff and he felt a lack of *belonging* within his team. Without trust, James lacked a belief in those able to assist him.

With an appreciation that performance preparation requires a personal strategy developed well in advance of the bout, James began using psychological skills as a key part of preparation. Within, he developed and posted his goals, which included personal skills in relation to his next opponent. Further, understanding extended to the importance of communicating openly with the coaching and management team, leading to shared understanding. From open lines of communication, James began to trust his team, and consequently, the team became highly collaborative. The subsequent bout was a step up in performance as James fought for a world title. In advance of the bout, James worked with his team and studied the opponent's tactics and his opponent's technical weaknesses. From a deepened understanding of what to expect, James managed himself well in pre-bout press conferences. Though he lost a unanimous decision, James continued to engage openly with his staff and also to employ a systematic adaptation approach to performance. The result two bouts later was that James became a professional world champion. The team continues to work together to present day and James has continued to advance as an athlete and also as a member of his larger team.

***Adaptation***

Adaptation within the vignette above best explains the process that transpired for James, leading to his expedited success as a professional boxer. Adaptation is a process comprised of five core motives the authors herein refer to as pathways. Built from the work of Fiske (1) and her precursor, Taylor (2), the pathways are comprised of *understanding*, *trust*, *belonging*, *control*, and *self-enhancement*. Within recent work proposed initially by Tenenbaum (3) and colleagues and then redefined by the first and second authors (4,5,6), there exist clear sub-strategies that were employed with James to build an adaptive approach to his boxing. Understanding entailed James' appreciation of himself. Through effective debriefings post-bout with the athlete individually and also with the team as a whole, correct and incorrect decisions were identified and subsequently documented 24 hours post-bout. In addition, James started using a diary twice per week, especially to seek understanding regarding the reasons behind variations in performance

during training (7). Understanding also extended to an appreciation amongst James and his coaching staff regarding performance expectations, and how communication would be delivered during the bout. The understanding of the opponent was garnered through an opponent profile. The profile was built with attention to the opponent's disposition, pre- and post-bout attributions, tactics during press conferences and also how he entered the ring immediately before each bout. Also considered were the opponent's patterns throughout the bout, during each round and also in the corner after each round. Understanding also extended to an appreciation of the performance venue (8). Included within an understanding of the context were the exact dressing room used for the warm-up, how the entrance to the ring would unfold, the ring's size, lighting, and the referee's behaviors during previous bouts.

Trust also became a central part of the intervention strategy. James' trust in himself was garnered through detailed documentation of what works, acquired from debriefings and logbooks. As such, his self-trust was based on evidence, and not solely from his talent. Often talented athletes build their trust in themselves by solely relying on the talent that brought them to international level (9). What many forget is that at the international level, opponents often share the very same talent. Hence, talent is an important though in many cases neutral factor. Trust in the team for James was a big step forward. Arguably, it is easy for athletes to rely on themselves as they progress up the ranks, to the point where they begin to meet equally talented opponents. Once opponents are of equal caliber however, as bouts draw nearer in time, trust must extend to one's coaching and management teams. With James, trust was garnered through better – consistent communication with coaches and management. When there were differences in opinion, discussions ensued until problems were resolved and all were satisfied with the outcome. Of note, trust is much easier to maintain than to restore ongoing. Given that an athlete's current views are situated in relation to past experiences, the intent is to ensure that as many past experiences as possible affirm trust (10,11).

Belonging also became an essential part of James' overall intervention. James' team became a cohesive unit, socially and in terms of the task. The motto of the team has become "team is team", meaning that the membership stuck together no matter what. Included within the belonging pathway were belonging with the coaching staff and belonging with teammates. When an athlete perceives his coaching staff as collaborative and integrated, he also views his training and performance contexts as positive. Belonging with the coaching staff can be developed through team activities such as team jogs in the week before the bout, team meals, team meetings, and a unified front during press conferences and media interviews. Belonging also extends to a sense of belonging among teammates, meaning amongst athletes. When the team is crafted thoughtfully, the athlete's teammates should be comprised of others who are highly optimistic (10,11), equally motivated and minimally, equal in athletic credibility. When accomplished athletes train together as part of a team, they tend to push each other forward, with each athlete bringing out the best in those around him. Belonging with teammates becomes an essential part of the overall intervention in the final week pre-bout. The intent is for the athletes the client has trained with to support him during final tapering, during the weigh-in, in the dressing room immediately before the performance, during the walk to the ring, and immediately post-bout within the ring. Positive affiliations with synergistic coaches and teammates tend to build momentum and perspective, an aspect often lost by performers before they under-achieve in high profile opportunities (12,13).

Control delineates into confidence, assertiveness, and distraction control. Confidence can be built holistically as it was with James through understanding of self (i.e. increased self-awareness), the opponent, and the context. When understanding extends beyond personal strategies, especially in professional boxing when there is sufficient time to garner such understanding, the athlete becomes substantively confident. In addition, through the athlete's enhanced trust in his team, beyond himself, and also a synergistic training and performance environment built through belonging, the intent is to develop an amount of confidence that can match with the upcoming bout. Assertiveness manifests through better relations with coaching and managerial staff. With open communication, the athlete is able to express concerns, voice his opinions, and ensure that his views become a central part of the team's strategies and decisions. Distraction control within our team is often first addressed when we evaluate the performance environment and the opponent's tactics. Within the performance environment, one athlete I have met several times was taken off his focus when walking to the ring. Several people from the audience spit at

him, which became a contextual intimidation factor. Though most distractions cannot be anticipated in advance, some can, thus decreasing what the athlete and his performance team are left to address onsite. Finally, self-enhancement is comprised of effort and ability. With James, effort was enhanced through all of the pathways aforementioned. For example, through self-awareness, based on documented evidence from previous fights, James understood partially where to direct his efforts during daily training and also when nearing his next bout. An appreciation of the opponent's tactics and style also informed where James and his team directed their efforts (effort is in part contextually determined). In addition, through enhanced trust of his team and also a sense of belonging, effort was sustained daily through a positive working environment. Ability became more important as James started to compete against the best boxers in his division worldwide. Ability can be confirmed through video footage of previous successes (14,15), and also optimal footage taken during training sessions. When new aspects were learned or existing skills were refined, James' coaching staff ensured that developments were in part attributed to personal ability. In addition, video was used to identify tactical errors and minor technical oversights during sparring, with post-training coaching team discussions leading to refinements within each successive day.

### **Conclusions**

Adaptation is a holistic approach to performance enhancement. Elsewhere (16), the authors have indicated that adaptation can superimpose on what is known from the sport coping literature (17). Matters of mastery and coping are central to our discussion whilst James is prepared for ideal and less than ideal circumstances. However, adaptation reflects a more detailed service model to prepare athletes such as James for the highest level of professional boxing. There are five pathways proposed to sport scientists and their clients, with each providing a viable entry point into the larger framework. Within each pathway, there are documented sub-strategies that SPC's can consider in relation to the client. Arguably the sub-strategies are re-packaged from mental training (12,18). Through adaptation however, the authors propose that mental training strategies can be considered thoughtfully as part of a theory informed approach to intervention.

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### **Commentary**

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Combat sports, and boxing specifically, are among the longest tenured sports in modern society. This fact, and the propensity for the media and lay public to highlight the barbaric nature of these activities, makes it somewhat surprising that there is a lack of research examining the biopsychosocial aspects of participation in these sports (1). While many outsiders regard boxing as an individual sport, Massey and Meyer (2) report that combatant athletes depend on coaches and training partners to enhance their physical and mental development as well as their performance. Our research and applied experiences provide support for the systems approach utilized by Schinke, Battochio, and Johnstone to improve James' preparation and psychological skills.

Schinke et al. describe an adaptation intervention in which the sport psychology consultant works with the athlete to develop understanding, trust, belonging, control, and self-enhancement, with each pathway contributing to the overall development and performance of the athlete. In the case of James, *understanding* was first approached by helping the athlete identify the origin of his fears. Understanding could also be approached by creating drills to help James simulate the demands of a competition, such as sparring sessions under bright lights with a rotating group of "fresh" training partners. This training drill would also require a high-level of *trust* in himself and his team, as well as a sense of *belonging* to the group. Thus, while Schinke et al. discuss developing an internal sense of trust, the consultant should also work with James to develop trust in his training partners, thereby enabling them to challenge him appropriately in sparring sessions. A sense of trust in self and others can also aide in facilitating a sense of control (3). For example, James can work with the consultant to create a "what-if" list for many of the uncontrollable and as yet un-experienced situations that have the potential to derail him and his team (4, 5). With a strong sense of trust in his teammates and training regimen, members of James' team can integrate items from the "what-if" list into his training. Additionally, by controlling his interactions with the media (e.g., blackout periods close to the fight, avoiding his own press), James can minimize not only the pressure of those contacts but also the pressure associated with a media-induced focus on winning and outcome. Finally, we concur that *self-enhancement* is gained through effort and ability, and thus strengthened through progress in the other four pathways. James' self-enhancement may be further augmented through viewing video highlights of his training and competition bouts.

In closing, we believe that the holistic and comprehensive method utilized by the authors of this chapter is consistent with the systems approach needed to provide psychological skills training to combat sport athletes. While additional scientific study is needed to more completely understand the needs of, and best practices for, this unique population, Schinke et al.'s work provides a good starting point for the examination of treatment paradigms in boxing and other combat sports (i.e., mixed martial arts). Future research should examine the role of coaches, training partners, and support staff in the development of peak performance among combat sport athletes. Only then can practitioners develop a deeper understanding of combat sport and the needs of the athletes within that particular sport context.

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## CHAPTER 29

### The Erotic Adventures of D: Interactions with a Triathlete

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#### *Vignette*

When Kate (a pseudonym), a 19-year-old triathlete, walked into my office I was struck by her beauty. If asked to describe my ideal female, I would have pointed to Kate. I was a 22-year-old neophyte in the first few months of my career as a sport psychology practitioner, and Kate had come to find out how I could help her prepare for her first international race in 10 months time. I was delighted to be recognised as having expertise and to be working with a talented athlete. The first session went well; I was guided by Taylor and Schneider's (1) intake interview guide, and over the 90 minutes together we discussed how mental skills could help her prepare for the event, and we explored various topics. We arranged to meet again the following week.

As Kate sat down at the start of the second session, she dropped a letter on my desk and asked me to read it. The letter said that she was grateful for the previous week's session and that I was the first person who had shown her true love. She had not ever been loved before, even by her parents and family, and she hoped that I would continue to love and care for her because she was a fragile and sensitive person.

My immediate reaction included anxiety and the realisation that I was out of my depth. I explained to Kate that as a sport psychology consultant I dealt with performance and not personal issues (a naive and false dichotomy). I knew a counsellor, however, who did deal with personal issues like the ones about which she had written. I asked Kate if she would be happy to meet the counsellor, and after she said yes, we walked together to the counsellor's office and made an appointment.

I continued to work with Kate for the following months until her competition. Our sessions were typically long, and I looked forward to them because I felt we had clicked and had built a strong rapport. Kate reported making good progress in counselling and after a number of months developed a romantic relationship with a male athlete whom I was also helping.

#### *Discussion*

The decision to refer Kate was a proper one, because my training had equipped me to educate clients about mental skills that could assist them with their sports performances. I had not been trained for much else. I was self-aware enough to recognise the boundaries of my competence and not let my erotic countertransference lead me to attempt to treat Kate's feelings of being unloved (and maybe unlovable).

The decision also forced me to deal, as best I could, with my feelings of guilt and shame. I had become overwhelmed with the fantasies I had experienced. Throughout the previous week I had pictured Kate naked, had wondered what she was like to kiss, and had fantasised about romantic intimate contact with her. My mental movies had been followed by shame and guilt. I understood that sexual liaisons are harmful in the therapeutic context, are an abuse of power, and are destructive for clients' (and my) welfare (2). I also felt I had violated the Christian principles my parents had taught me (more shame).

My reflections were narrow and misinformed by a focus on sex. Although the erotic is typically equated with sexual attraction, it involves much more than physical desire. An erotic experience may involve multiple desires at play (e.g., closeness, interconnectedness; 3). Consciously, I recognised that I was erotically attracted to Kate. It was not until I reflected on the experience after termination of the consulting relationship, that I came to understand that I was also attracted to Kate because she helped me feel competent. Kate worked hard at her mental preparation, applied the strategies we discussed during her physical training and competitions, and gave me positive verbal feedback about my assistance. I interpreted these signs as indicators that I was good at my job.

My focus on my own reactions (anxiety, excitement, arousal, shame), coupled with my narrow view of applied sport psychology, interfered with my level of empathy for Kate. My surprise at the way Kate reacted after the first session was a sign of my limited appreciation of the potentially deep interpersonal connections that may develop in service to others. With the benefit of experience, I can better understand Kate's reaction to our initial meeting and appreciate how she might have viewed me as a stand-in romantic (or even parental) love object for what had been missing in her life (4). I had displayed a caring non-judgemental attitude, a focus on her welfare and interests, and an absence of a self-serving agenda. The letter she wrote probably indicated that my caring, unconditional approach had been a profound experience for Kate, and she likely felt relieved to learn it was possible, acceptable, and safe for her to share personal sensitive material with another person; love was not confined to romantic movies and books. And how did I respond? Metaphorically, I kicked her when she was down, and communicated that some material is not acceptable and should remain unmentioned. That Kate focused on mental skills training after session two and that we largely did not delve into her love issues (attributable, in part, to the help she was receiving from my colleague) was probably influenced by the way I responded to her when she did share her sadness and longing.

After the session when Kate dropped her letter on my desk, I contacted a mentor for advice. Early in my career, formal training and supervision pathways had not been established in the country where I was working at the time). Individuals with minimal training were helping athletes and, in many cases, were receiving no supervision. I was fortunate to have a mentor who helped me when needed. My mentor operated from a psycho-educational perspective in which practitioners assisted athletes with their performance, but not their personal, issues. He agreed with my decision to refer Kate to a counsellor and reinforced my justification that it was an ethically sound course of action. My mentor, however, did not help me deal with my fantasies and emotions, or reflect on how I may have influenced the situation. I also did not admit to these feelings and thoughts, because I worried he might have thought I was a suspect practitioner for having them. It was not until I read some psychodynamic literature and received mentoring from a psychodynamic-oriented practitioner (second author) that I worked through my own countertransference erotic material and gained greater insight into my interactions with Kate. With this help, I was able to accept that my fantasies were normal human reactions, that I was not a pervert or an unethical practitioner, and also that I could manage my thoughts and emotions so that I could stay focused on helping clients.

Although I largely enjoyed working with Kate after session two, I also felt some anxiety when meeting her because I worried I would reveal, unintentionally or unconsciously, my erotic feelings. Not sharing my erotic countertransference with Kate was a correct decision, because it would have placed her in an unreasonable position; dealing with my thoughts and emotions was my responsibility, not Kate's (4). Given that I had no experience in working through my longings and emotions, and no supervisor who might have been equipped to help me, suppression and avoidance were my only coping strategies. By engaging in self-surveillance and self-monitoring, I may have been less authentic and *present* with Kate than I might have been otherwise, and this may have limited our working alliance to some degree.

Through my experience with Kate, and several of my other early clients, I realised that to be effective, I needed to be able to do more than just teach clients to use mental interventions (e.g., goal setting, imagery, self-talk, relaxation) to enhance performance if I were going to help them with their issues (5). My realisation led me to return to formal education and was also a reason for the topic I chose when completing a PhD (i.e., how sport psychology graduate students develop into competent, effective, and ethical practitioners).

### **Conclusions**

Athletes and sport scientists (not just sport psychologists) will likely experience erotic desires and longings when interacting with each other. Clients are often young, athletic, attractive, and outgoing. Many sport science consultants are caring, non-judgemental individuals interested in their clients, and that care (a form of love) can be attractive to athletes (6). Across the sport sciences, erotic material in applied service is probably seldom discussed in training or supervision beyond prohibitions against sexual misconduct. Such taboos and avoidance of discussing the erotic in athlete-consultant relationships may leave practitioners fearful of voicing their desires with mentors and unable to manage their erotic thoughts and feelings, as well as, potentially, their emotions of anxiety, guilt, shame, and confusion. Open discussion

about such material, however, may help prepare practitioners for a phenomenon that is likely to occur sooner or later (7).

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As sports scientists from any discipline, we can from time to time be subject to temptation. Accordingly, I empathise with the experiences, challenges and conflicts indicated in Tod and Andersen's case study. I too have been confronted by situations where there is a risk of desire rendering me unprofessional. On a number of occasions, during the 12 years I worked for the British Olympic Association, I was propositioned by female athletes. Although it is incredibly flattering to be thought of as attractive by another attractive human being, from a professional perspective caution is required. Often the athletes concerned are vulnerable, either as a result of their ages or their career desires (they want to be part of the team and represent their country) and the perception that you represent authority. This latter point is particularly important as power and authority are themselves powerful aphrodisiacs and, as sports scientists, we must remind ourselves of that fact. Perhaps it is that power and authority, rather than us as individuals, that athletes are attracted to.

Most sports scientists seek careers in this area stemming from their own enthusiasm for sport. For the younger sports scientist, when working as part of a team of support staff, they very often align with the athletes they might themselves once have had aspirations to be and to whom they are, generally, closer in age than some of their support staff colleagues. We are there, however, because of our jobs, and so, generally, it is best to avoid potentially compromising situations and remember to maintain professional distance from athletes who, in reality, are akin to *clients*.

That mutual attraction should develop is not surprising and, in most cases, between adults in this environment, it is neither wrong nor unhealthy. Nevertheless, even where consent is forthcoming, in my opinion, in this context it is not correct to act upon one's feelings. If the attraction is so strong that a romantic relationship, and all it entails, is unavoidable then a change of circumstance is required. That is, resigning from work with that particular sport or team demonstrates integrity and arguably eliminates professional concerns (including conflict of interest). Professional misconduct is a serious accusation and one which could not only result in job loss but, the reputation which will subsequently follow you around, could make getting another job difficult, or worse, find yourself facing disciplinary proceedings. I suggest practitioners examine the professional code of conduct on this issue, but the take home message is that prevention of a relationship starting is better than trying to find a way to make it work. However, if mutual attraction is strong then sacrificing work in that environment is advisable. It demonstrates commitment both to the other person and to one's career.

Any relationship that might develop with an athlete should be considered as serious; serious, because of the professional issues involved. It has always been my contention that all support staff, whatever their parent disciplines, should attend, at least, the most basic of counselling courses. This could provide

support staff with greater skills with which to do the right thing in many sensitive situations. After all, we are all human and subject to the same desires.