



**Australian
Taekwondo**

Sports Science Framework

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Purpose

This document has been developed to ensure a safe approach to Sports Science and Sports Medicine (SSSM) for Taekwondo athletes throughout Australia. It will help athletes and coaches understand what is expected and what is safe and highlight the need to develop a rapport with clinicians in private practice and other SSSM Staff to ensure safe, appropriate and effective support is provided. It will ensure there is a consistent approach to Australian Taekwondo (AT) philosophy and expectations around service provision of the scientists and medical support staff who work with our athletes.

Key Targets

- Service providers in the daily performance environment (DPE) exceed minimum qualification standards for AT supported athletes
- Sport Science and Medicine usage should be proactive, not reactive
- Service providers in the DPE have accountability with coaches, athletes and other providers
- There are processes to identify athlete strengths and weaknesses
- Systems and processes are intuitive and time efficient
- Fewer athletes withdrawing from AT teams due to preventable injury or illness
- Less training time lost due to preventable injuries or poor management of training load
- It is strongly recommended that private medical insurance is taken out by all athletes.



What Does A High-Performance Environment Look Like? ...

High performance sport refers to that engaged in by elite athletes who achieve, aspire to achieve, or have been identified as having the potential to achieve, excellence in world class competition. A high-performance sports environment is not just about the level of athletes involved, the available facilities or having a long list of service providers able to work with athletes and coaches. It is more about developing a culture based on attitude and the motivation of everyone involved to achieve the best possible performance via continuous improvement. This approach extends to management and administrators who must also support the athletes and coaches and the implementation of any systems.

A high-performance environment is about maximizing every athlete's physical, mental, technical and tactical potential and ensuring it is better than the opposition. A high-performance environment results in a more consistent and reliable prediction of performance because of greater training consistency and a greater level of support. The basics are executed before the 1%'ers are considered, and fads and gimmicks are generally ignored. Changes to programs are based on evidence and logical risks are calculated after consideration by experts rather than on hearsay or testimonials from salespeople. Without data, there is just opinions. Everyone involved in a high-performance environment should have a philosophy of continuous improvement and should always be looking at "what" and "how" to improve their own contribution to the environment.

With the large numbers of available SSSM disciplines to work with modern day athletes and coaches, whether athletes and coaches engage directly with all providers is another matter. If athletes and coaches do engage practitioners, there must be excellent communication and cohesion between the staff, and efficient systems must be developed to ensure information flows in a timely manner and relevant data is available to all necessary parties. For example, training plans and any monitoring of training load needs to be overseen and monitored by the coach, ideally these should be developed in collaboration with S&C staff to ensure the S&C development complements the taekwondo specific training. Load monitoring can also be supported by a physiotherapist, the physiologist and the S&C coach, as all can provide input and support the need to minimize overload related injury.

Athletes, coaches and SSSM practitioners must have a multi-disciplinary approach as one discipline cannot work in isolation. For example, undertaking physiological testing without considering basic kinematics or any other technical changes can obscure results interpretation, whereas biomechanics requires support from strength and conditioning (S&C) and physiotherapy to assess whether the athlete is physically capable of any recommended changes, and the skill acquisition experts require input from biomechanical staff to quantify the skills they are working with coaches to modify. All people in a high-performance environment are encouraged to be innovative and find the time to be able to think creatively. SSSM practitioners should be regarded as experts who can provide detailed evidence and support for program design and athlete development.

Finally, a high-performance environment must also support the holistic development of the athlete. This approach ensures young athletes are inducted appropriately and are aware of the expectations, their endeavours outside of sport are encouraged and supported, and their exit from the high-performance environment is also considered and supported.

What Does A High-Performance Environment Look Like? ...

SSSM experts can cover the following disciplines:

Sports Physician (specialist doctor)	<ul style="list-style-type: none"> • Point of contact for all performance related injuries and illness • For general health and well-being, athletes should see their personal GP
Physiotherapist	<ul style="list-style-type: none"> • Preferably athletes work with a single clinic and have a primary practitioner as the main contact. Ideally they should also attend planning meetings, and also some training sessions • Works with S&C and Biomechanics to ensure athletes are capable of the technical changes coaches are trying to implement • Is involved in assessing and quantifying training load
Soft-Tissue Therapist	<ul style="list-style-type: none"> • Preferably athletes work with a single, or limited number of providers. • Works with physiotherapists to communicate any observations made during treatment
Psychologist	<ul style="list-style-type: none"> • This person may work with the athletes, their families and /or coaches • Provide individual assessment of status of each athlete and develop some generic education resources • Individual follow-ups can be claimed through private health insurance of medical rebates
Dietician	<ul style="list-style-type: none"> • Provide individual assessment of the nutritional and dietary status of each athlete as per Individual Athlete Performance Plan • Develop some generic education resources • Individual follow-ups may be covered by private medical insurance
Biomechanist	<ul style="list-style-type: none"> • Generally employed through AIS or SIS/SAS • Is responsible for assessing and quantifying technique (and may assist with competition analysis)
Performance Analyst	<ul style="list-style-type: none"> • Works with coach to perform competition and/or player analysis to gain insight into technical/tactical improvements that can be made • Assists coach to educate athletes on tactical/technical adjustments based on observations (typically from video)
Physiology	<ul style="list-style-type: none"> • Generally employed through AIS or SIS/SAS • Is responsible for assessing and quantifying the physiological status of an athlete • Is involved in assessing and quantifying training load • Often work with coaches reviewing planning, performance and overall training plan development
Strength & Conditioning	<ul style="list-style-type: none"> • Sometimes employed through AIS or SIS/SAS • Sometimes employed through programs/clubs • Responsible for incorporating strength/power development and injury prevention and rehabilitation activities into a training program • Works with coaches providing input into planning, performance and overall training plan development • Works with support team to address specific needs or issues which can be addressed with gym based training
Skill Acquisition	<ul style="list-style-type: none"> • Generally employed through AIS or SIS/SAS • Work with coaches to address skill development through best-practice coaching and training plans
Personal Excellence	<ul style="list-style-type: none"> • Generally employed through AIS or SIS/SAS although limited services can be accessed through University contacts • A contact for athletes to assist with a number of areas outside of Taekwondo • Includes dual-career assistance, athletes' personal and professional development, and life-balance considerations



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What Does A High-Performance Environment Look Like? ...

Athletes and Coaches may not necessarily use these all of these experts at all stages of the year but are encouraged to source experts from each area, even if only to use their expertise and experience as a sounding board and bounce ideas off. It is impossible for an athlete or coach to develop expertise in all areas. It is important they can contact specialists for advice or assistance when appropriate. Athletes and Coaches may choose to operate with many support staff, or may prefer to work predominantly with only one or two individuals. However, it is important for those staff not to operate outside of their areas of expertise and should defer to other experts and disciplines as a professional courtesy. Coaches may prefer to have a small team of regular providers who provide most of the support, with either the coach or these providers helping to source expert opinions when questions arise.

A high-performance environment ensures the basics are adhered to before investing in the generally more expensive options which may only offer small potential improvements (the so-called 1%'ers). The SSSM practitioners are systematic about their processes (any testing and competition routines), and document their processes, interventions and training loads (planned and actual). This enables coaches to review what was planned, what was executed and evaluate performances to address any areas which can be modified or enhanced in the next preparation cycle. To assist in this monitoring and review, ideally all information must be stored centrally so the program has ongoing access to this information. Finally, a high-performance environment is also subject to periodic review to reassess its needs and determine the best support model and required expertise.



Daily Training Environment – High Performance Environment

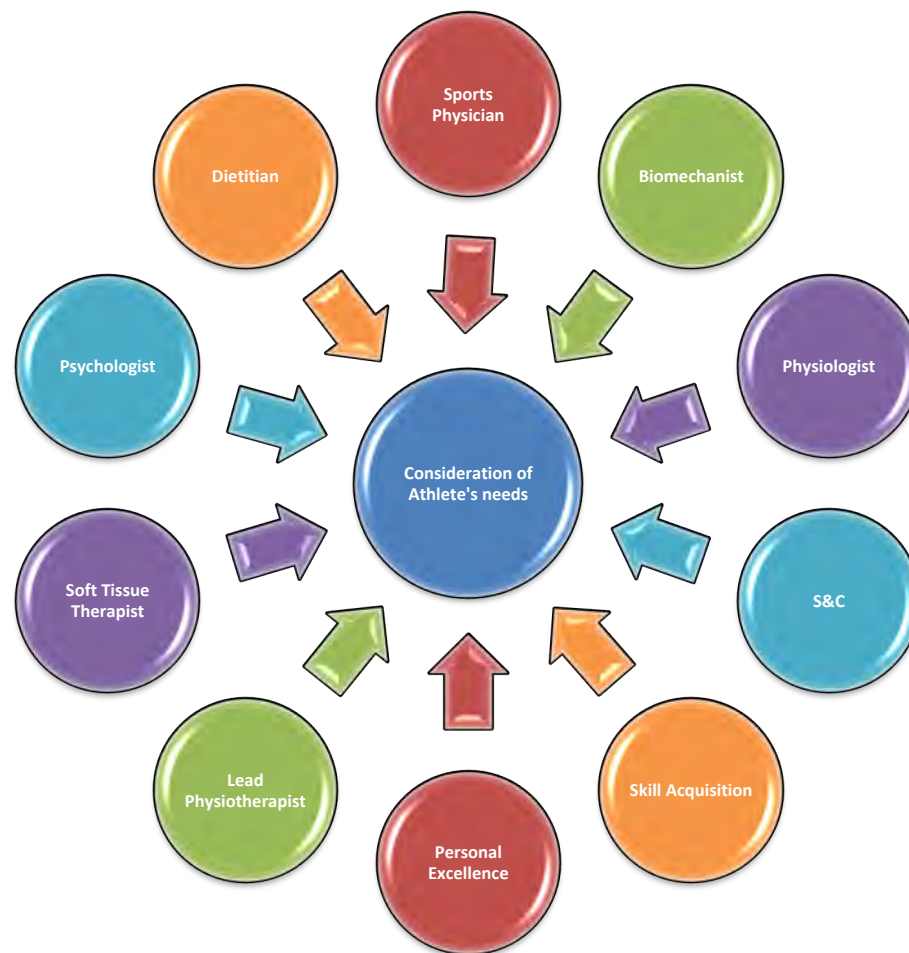
AT has an athlete-centric approach. This means that the focus of discussions between coaches, athletes and providers should always be focused on what is best for an individual athletes' development.

Excellent communication is required between coaches and SSSM experts to ensure everyone is aware of the needs of the athlete and coach. There should be cooperation and communication among SSSM experts across disciplines to ensure greater collaboration within the DPE to improve servicing and effectiveness.

An effective method of communication between coach and support staff is a regular meeting (weekly/fortnightly) where issues are discussed in person or by telephone or video conference.

If a support team is large (i.e. more than 5 providers) a more effective streamlined process may be for the coach to have a key sports science provider (any discipline or a coordinator) who has the most regular communication with the coach and helps in program planning and decisions. This key provider takes responsibility for having more detailed conversations with all service providers to make sure the advice that is given to the coach has been well considered.

Service providers should make sure that all necessary information is communicated to the athlete but care should be taken not to undermine the work of other providers. SSSM providers should have more in depth discussions with other providers and the coach when they want to debate the pros and cons of various program decisions/plans. More experienced/mature athletes may have more in depth discussions with individual service providers more decision-making power about their individual program than a younger/inexperienced athlete. A coach should make sure the right balance is in place.



An athlete and coach should embrace SSSM experts and use them preventatively. Providing a token *ad-hoc* service will have minimal impact on an athlete's performance. Service providers must be given the opportunity to develop a rapport with coaches, athletes and others to be effective.

Framework for Taekwondo Sport Science Support - Organisational Responsibilities

AT

- Oversee HP Program (strategy and operations) and Individual Athlete Performance Plans (IAPP) for categorised athletes
- Ensure SSSM support staff have access to HP program communications and IAPP information
- Provide national direction for sport science providers and knowledge growth priorities
- Provide communication channels between SSSM support staff and with HP program staff
- Oversee education/compliance requirements regarding ASADA, match-fixing etc
- Annual review of HP program SSSM support

NIN / UNIVERSITIES/PRIVATE PROVIDERS

- Provide SSSM support in the DPE
- Conduct taekwondo related research projects with local coaches and athletes to answer coaching questions
- Assist local coaches with completion of IAPPs
- Provide education to senior coaches and where required development coaches

AIS COMBAT CENTRE

- Provide guidance to AT HP program on SSSM priorities and contacts in key DPEs
- Provide support in collaboration with the local providers through advice and re-deployment of resources
- Conduct taekwondo related research
- Ensure staff are appropriately certified and compliant with NSO requirements

SSO

- Provide education for development coaches
- Provide sport science support/education to development coaches and athletes.

AT

- Fund and coordinate support staff deployment (e.g. medical/performance analysis) to key domestic events as required

NIN / UNIVERSITIES/PRIVATE PROVIDERS

- Provide support to taekwondo related research /data gathering at key domestic competitions to answer HP program questions
- Provide SSSM support for high priority categorised athletes if requested by the HP program

AIS COMBAT CENTRE

- Conduct taekwondo related research /data gathering at domestic competitions to answer HP program questions
- Provide value-adding science/medicine support at key domestic events as required

SSO

- Provide sport science support at national /state championships as required

All relevant information is stored centrally to ensure seamless transition of information and facilitates communication opportunities across the network.

AT

- Fund sport science & medical support for senior elite National Team training camps (international and domestic)
- Coordinate and fund sport science & medical support for cadet/junior National Team training camps as required
- Provides preparation funds for categorized athletes which can be used for SSSM support or training camps

NIN / UNIVERSITIES/PRIVATE PROVIDERS

- Work with AIS Combat Centre to provide SSSM staff for senior elite National Team training camps (international and domestic)

AIS COMBAT CENTRE

- Provide and coordinate SSSM staff for senior elite National Team training camps (international and domestic)
- Advise on appropriate SSSM support for cadet/junior national team training camps

SSO

- Provide SSSM support for State development camps or National Team camps hosted in their state as requested

AT

- Fund SSSM servicing and personnel on senior (and Junior) National Team competitions as per HP program priorities
- AT to cover cost of consumables and freight if applicable.
- Ensure selected team staff are appropriately qualified and compliant with anti-doping and match-fixing education requirements

NIN / UNIVERSITIES/PRIVATE PROVIDERS

- Provide SSSM support - personnel and equipment as required.
- Staff expected to be reimbursed at acceptable professional levels throughout team service

AIS COMBAT CENTRE

- Advise AT on appropriate levels of SSSM servicing and personnel for senior (and Junior) National Team competitions
- Coordinate SSSM staff for senior elite National Team competitions



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Best Practice SSSM Guidelines

Whilst best practice often requires a financial relationship with private clinicians through the potential use of retainers, mutually beneficial links can also be developed which are not based on funding. This may be through preferred provider networks and advertising opportunities within clubs or facilities, or programs can develop a relationship with local universities to provide placement opportunities for local students who can then provide a pre-determined amount of support to coaches. It is up to programs to explore opportunities with preferred providers.

For most service providers, athletes and coaches should identify suitable practitioners who have the knowledge and professional attributes that can work within their DPE. Service providers should be suitably qualified and references should be sought from previous employers. Time should be spent ensuring the potential SSSM experts are the correct fit for the personalities of the athlete and coach to ensure “buy in” to the relevant programs or strategies. Engaging with the cheapest or the “most convenient” option can present unforeseen issues that lead to a less effective outcome for the athlete and coach.

If a service is not provided by a SIS/SAS, a private practice may be used so long as practitioners adhere to AT guidelines regarding qualifications and accreditations.

Ideally all data pertaining to an athlete must be stored centrally by the AT HP program. One option for this is using the Athlete Management System (available through advice from AIS). This enables all staff working with a coach or athlete to be able to access any relevant information which may influence decisions and assists in the communication regarding status, priorities and progress towards identified goals. Coaches are strongly urged to ensure athletes are monitoring their own wellness and daily habits as well as training load information (ideally through the AMS) as this can also assist in developing an improved understanding of how athletes respond to various training loads.

It is strongly recommended that private medical insurance is taken out by individuals who do not currently have any cover.



Coaches Blueprint Setting Up & Working With Support Team ...

Purpose

The purpose of this blueprint is to provide detailed guidelines for Australian Taekwondo coaches on best-practice ways of working with sports science and sports medicine support staff.

Background

A key priority for a high-performance coach is to engage with an appropriately qualified service team of sports science and sports medicine specialists. Modern coaching requires expertise across multiple disciplines and significant scientific and medical support. It is impossible for any individual coach to have the necessary expertise across all disciplines to ensure best practice, and be truly innovative without the input of others because of the time required to stay abreast of latest coaching, sports science, and technology trends and ideas.

Coaches should develop close relationships with experts/specialists in various areas that may either work directly with the athletes, or be a resource for advice or information for coaches. Both methods have their merit with certain disciplines, and the use of providers and how they are integrated within a program may often change over time and through a preparation phase so athletes are not bombarded with input from too many providers at a single time. Ultimately the coach is the conduit for dissemination of important information between the service team and the athlete.

In identifying potential support staff, coaches should contact AT or the AIS Combat Centre for advice on recognised providers. The providers in many cases are also regularly involved in state and national team duties. Appendix 1 lists the guidelines for minimum accreditation requirements for AT support staff. That is, AT teams will only utilise support staff that meet the listed criteria as there are risks with using unaccredited/unqualified staff. These risks include a lack of appropriate professional indemnity insurance, a lack of any requirement to adhere to any code of conduct by a governing body, a lack of a requirement to adhere to any anti-doping code, a lack of any regulation regarding client confidentiality, and inappropriate use of recognised athletes in their business promotion.

There is significant variation in the breadth of knowledge and expertise available in the sports science and sports medicine community in Australia. Even if a coach has had a poor experience with a practitioner or discipline area in the past, this doesn't mean another practitioner would not be able to add significant value to the program. Coaches are encouraged to identify what professional and personal attributes they would like to see in potential service providers to combine with the knowledge and skill a discipline may provide their program. AT and the AIS Combat Centre can then help find a suitably trained practitioner with those attributes, and the complementary knowledge and skills, to add to the coaches' high performance program.

The fundamental approach of SSSM staff is to do no harm. Beyond that, the relationship between the sports physician, physiotherapist and strength and conditioning staff is critical as they are most likely to have the greatest impact on an athletes' likelihood to return to training and minimize the time lost due to injury or illness. These are the primary providers which need to be addressed before some of the other disciplines are finalized.

Coaches Blueprint Setting Up & Working With Support Team ...

Sports Physician

A primary individual needing to be identified early in the establishment of a service team is a sports physician. Physicians take the primary role in case managing sporting injuries, common and/or infrequent illnesses, and often routine GP duties. When an athlete has an injury or illness that is affecting training or competitive performance, they should always see a sports physician for diagnosis and development of a treatment/management plan.

For other routine ailments and illnesses, it is fine for an athlete to see their regular family GP. It is the athlete's responsibility to ensure that if a GP is involved, that the GP is fully aware the athlete is governed by the WADA code as this may impact on any prescribed medication. Parents of under-age athletes should also be aware of the code and its implications. When an injury has been treated by other health professionals and does not appear to be improving, these cases should always be referred back to the sports physician for review. All medical consultations ideally should be recorded in the Athlete Management System (AMS).

Physiotherapist

It is preferred, but not essential that the physiotherapist working with high-performance athletes is a Masters-titled Sports Physiotherapist (this is a requirement for any Olympic Team appointment). This individual is a key member of the service team and one with whom it is critical that the coach develops a good communication strategy so the physiotherapist is aware of what is happening within the training environment. It is also important that information and any injury updates are reported back to the coach in a timely (same day) manner.

It is also a good practice to get the sports physiotherapist to attend regular training sessions to get a better understanding of what the athlete is doing and understanding their functional abilities and issues, not just viewed in isolation. A regular visit to training is also a cost-effective way to see athletes in a pro-active manner - this preventative action may reduce the need for subsequent clinical treatment if small issues can be addressed early and regularly.

Massage Therapists

It is also very important for massage therapists to meet minimum standards. Soft tissue or massage therapists should have recognised qualifications and be registered with the Association of **Massage** Therapists (**AMT**), Australian Association of Massage Therapists (AAMT), or an equivalent professional association. Providers in suburban shopping centres are generally not qualified for medical rebates and may not have the experience necessary to treat elite athletes.

Massage Therapists are often referred through medical clinics or through word-of-mouth from other athletes. It is important athletes locate a good massage therapist and the more often they see them, the better the therapist will be able to get to know the athletes, and identify clinical or functionally-relevant changes and musculo-skeletal issues.

Coaches Blueprint Setting Up & Working With Support Team ...

Strength & Conditioning

S&C Coaches need to be tertiary qualified and accredited with the Australian Strength & Conditioning Association (ASCA) and be part of its Professional Scheme or an equivalent professional S&C body. Preferably Strength and Conditioning coaches working with elite athletes in AT's program should be qualified as an ASCA Level 2 coach. Coaches should engage an S&C coach who has the capacity to work with the coach and is willing to integrate their S&C program as part of the overall program. There are often instances where S&C providers pay no attention to the overall training program, resulting in additional loads placed on the athlete through lack of consultation and culminating in injury. It is the responsibility of the taekwondo coach, physiotherapist and S&C provider to communicate regularly on the planning and periodization of the program, and the specific S&C activities. Where changes are made to the plan, close cooperation and communication is required to ensure progress is maintained.

Psychology

To have the skills required, the provider must have completed a Master's degree in Sport or Clinical Psychology. Potential contacts can be sourced through the Australian Psychology Society's (APS) College of Sport Psychologists, or by contacting the AIS Combat Centre. A psychologist can assist both coaches and the athletes with general wellbeing, performance enhancement, competition readiness, stress management, relationship management, and team harmony.

It is valuable to have a sport psychologist regularly observing training in order for them to get a better understanding of the workload, the stress triggers, the individual coping strategies and to provide the coach with strategies that may enhance athlete behaviour. This is a cost-effective way to provide regular input and reduce the need for subsequent clinical visits if small issues can be addressed early and regularly.

Additional Support Team Members

Information regarding biomechanists, physiologists and skill acquisition scientists can be obtained through the NIN as there are very few in private practice. Dietitians must meet the minimum standards and contacts can also be sourced through the AIS Combat Centre or directly through the Sports Dietitians Australia (SDA).

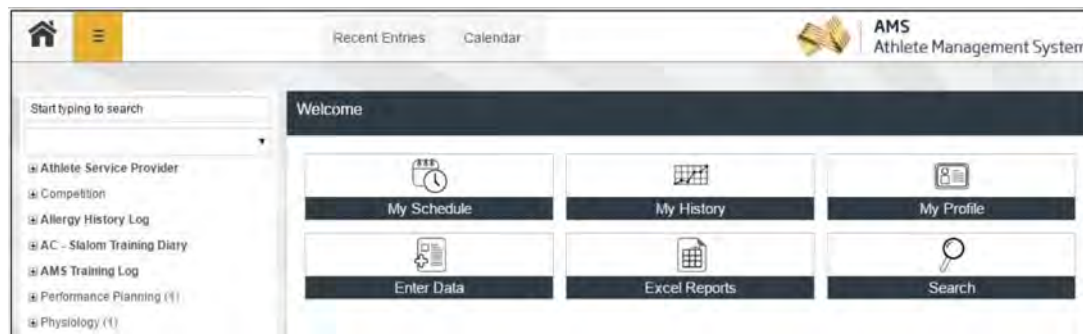
Coaches Blueprint Setting Up and Working with Support Team

General Guidelines

Coaches should look for providers who communicate well, and regularly with the coach, the athlete, and other service providers in a multi-disciplinary environment. Coaches should be proactive in following support staff up for information and advice as delays in communication can lead to confusion and poor performance. Coaches should be ensuring support staff are communicating with each other and ideally reporting through the AMS regarding aspects of service provision as the different perspective can result in significant changes in understanding and subsequent programming. Coaches also need to be mindful that athletes are not becoming dependant on particular staff. Support staff should be assisting the coach develop resilient, not dependant, athletes. Coaches also need to ensure support staff provide services only within their area of expertise and not become “gurus” to the athletes. Some coaches may work with multiple providers within certain disciplines. This is often the case in psychology where the relationship between athletes and providers is critical so not all athletes will relate to a particular provider. Whilst preferable to work only with single providers within each discipline (physiotherapists, massage therapists, sport science providers etc), when not possible, the coach must ensure there is clear communication between the multiple providers to ensure the message to and from the athletes are consistent.

Senior athletes should be involved with planning and ongoing discussions so they don't go off to unknown providers who may or may not have appropriate knowledge, and/or be aware of what the plan is. Athletes knowing who the support team is, decreases the likelihood that they will shop around to providers until they 'hear' the information they want to hear. Coaches are responsible for following up with athletes and staff and checking progress is occurring and at an appropriate rate. Coaches need to be aware of any appropriate milestones in a rehabilitation program; and providers (including the coach) understand when and how volume and intensity can then be increased in the program.

Athletes need to have their cases reviewed, generally by a physician if health, well-being or musculo-skeletal issues are not improving after 3-4 weeks of treatment.



Appendix 1: Guidelines for Accreditation Requirements for SSSM Staff

Sports Physician:

Full medical practitioner registration with the Australian Health Practitioner Regulation Agency (AHPRA).

Fellowship of the Australian College of Sports Physicians (or equivalent).

Physiotherapy:

Must be a registered physiotherapist with the Australian Physiotherapy Association (APA).

Must be registered with the Australian Health Practitioners Regulation Agency.

Highly preferable that the physiotherapist has extensive experience working with elite athletes

A Masters/PhD in Sport Physiotherapy an advantage (but not essential)

Massage Therapy:

Diploma of Remedial Massage (or equivalent qualifications in Myotherapy)

Association of **Massage** Therapists (**AMT**), Australian Association of Massage Therapists (AAMT) or registration with equivalent professional association.

Eligible for all Health Fund provider numbers

Psychology:

Tertiary qualifications in Psychology with a Masters/PhD in Sport Psychology.

Registered Psychologist with AHPRA.

Eligible for membership of Australian Psychological Society's (APS) College of Sport Psychologists.

Nutrition:

Must have tertiary qualifications in Nutrition and Dietetics.

Must be a registered as an Accredited Practicing Dietitian with Dietary Association of Australia (DAA).

Must be an Accredited Sports Dietitian with Sports Dietitians Australia (SDA).

A Masters/PhD in a relevant discipline an advantage (but not essential).

Strength & Conditioning:

Tertiary qualifications in Sport Science/Strength and Conditioning with a post graduate qualification in a relevant discipline an advantage (but not essential).

Eligible for Membership of Australian Strength and Conditioning Association (ASCA)

Professional Coaches Scheme at Professional level.

Physiology:

Must have tertiary qualifications in Sports Science with speciality in Physiology

A Masters/PhD in Physiology preferred (but not essential).

Must be ESSA accredited (after end 2018)

Eligible to meet employment requirements within the Australian NIN system.

Follows National Sport Science Quality Assurance (NSSQA) guidelines and appropriate certification standards where applicable.

Biomechanics:

Must have tertiary qualifications in Sports Science with speciality in Biomechanics

A Masters/PhD in Biomechanics preferred (but not essential).

Must be ESSA accredited (after end 2018)

Eligible to meet employment requirements within the Australian NIN system.

Follows NSSQA guidelines and appropriate certification standards where applicable.

Skill Acquisition:

Must have tertiary qualifications in Sports Science with speciality in Skill acquisition

A Masters/PhD in Skill acquisition preferred (but not essential).

Must be ESSA accredited (after end 2018)

Eligible to meet employment requirements within the Australian NIN system.

Personal Excellence:

Tertiary qualifications in Education, Psychology, Career Guidance, Personal Development and/or other relevant area

Eligible to meet employment requirements within the Australian SIS/SAS system.

Eligibility for membership of the Career Industry Council of Australia (CICA).

Appendix 2: Definitions of Sport Science

Definition of Sport Science

Sport Science is the study and application of scientific principles and techniques to understand and provide information that can be used to improve sports performance.

Service provision without a conceptual framework or purpose is not science, although it often forms a legitimate part of the work of an applied sports scientist. Sport science is not just the application of existing knowledge and procedures to sport. Sport science also involves the development of new technology and knowledge of 'real-world' sporting environments.

The focus should be on *applying the scientific method* to address specific issues that have an influence on an athlete's performance.

The **scientific method** refers to techniques for the investigation of phenomena and the acquisition of new knowledge, as well as the refinement and integration of previous knowledge, based on observable, empirical, measurable evidence, and subject to laws of reasoning. There are identifiable features that distinguish scientific inquiry from other methods of developing knowledge. Scientists propose specific hypotheses as explanations of events or phenomena. These hypotheses have as logical consequences the prediction of additional, observable phenomena. Scientists design studies that test these predictions for accuracy. These steps are repeatedly reviewed, refined or rejected in order to make increasingly dependable predictions of future results. Once a hypothesis is repeatedly verified through experiment, it is considered to be a theory and new predictions are based upon it. Erroneous predictions, internal inconsistencies, or unexplained phenomena initiate the generation and consideration of corrections or alternative hypotheses, which are themselves tested, and so on.

Definition of a Sport Scientist

Sport scientists are tertiary-trained professionals who provide advice on technical and practical aspects of training and competition, talent identification and talent development, injury prevention, pre-event preparation, technique, nutrition and recovery practices, to optimise performance in sport. They work in partnership with coaches, medical staff, and other members of the high-performance team to enhance the performance of individuals and teams. Sport scientists should be viewed as expert specialist advisers for coaches, capable of providing specialist applied knowledge and perspective integral to the process, rather than just as service providers.

The primary role of the sport scientist is to systematically obtain relevant information in order to address specific practical issues in an objective manner. Their primary aim is not to gain knowledge for their own sake but to improve the preparation of taekwondo athletes for competition. The process must be objective (and ethical) so that the scientist does not bias the interpretation of results or change the results outright. The process must adhere to relevant scientific conventions to ensure meaningful results and protect the integrity of the data.

The applied sport scientist sits between the pure scientist and the pure engineer on a continuous spectrum. Where exactly they sit depends on their personal interests, e.g. whether they have a pure research or applied focus. Their position along the spectrum may also depend on the specific or potential application at the time and the environment they are working in. For example, S&C coaches and dietitians work to engineer a result or a specific adaptation rather than simply understand the how and why something occurs.



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