were systematically searched using the following key themes: 'femoroacetabular impingement', 'work' and 'risk'. Key findings from the included studies were extracted, including risk factors, prevalence or incidence and risk ratios (e.g., relative risk, hazard ratios, and incidence rate ratios). Included studies were critically appraised using the Joanna Briggs Institute tools.

Results: Six studies met the eligibility criteria, with the average methodological quality generally indicating 'good' quality overall. The findings from this review indicate that FAI is more prevalent in occupations involving high physical activity, such as professional soccer and hockey players and military personnel compared to the general population. While specific occupational tasks were not highlighted in the included studies, the occupational demands described for each occupation suggest that occupations involving repetitive hip flexion (e.g., kicking and squatting) and sustained positions in extreme hip joint ranges were associated with FAI. Occupations where these loads are, or have been, experienced prior to skeletal maturity (e.g., professional, or elite athletes) and workers with a history of high-level sport or physical activity participation (e.g., military personnel) are at higher risk of developing FAI. The review also found military personnel with FAI were observed to have lower hip joint space measurements when compared to civilians with FAI, and this may further compound the development of FAI in military personnel by bringing the bone structures within the joint closer together and so making impingement more likely.

Discussion: The findings of this systematic review found occupations where individuals are constantly exposed to high-intensity and high-impact physical activity as well as repetitive and supra-physiologic hip loading conditions are more prone to developing FAI. However, the studies identified in this review unfortunately did not contribute to elucidating which specific occupational tasks, at which frequencies and durations, would increase the likelihood of developing FAI, particularly in physically demanding occupations.

Impact: Professional athletes and military personnel are at a higher risk of developing FAI. As FAI is a precursor for hip osteoarthritis, specific risk factors for FAI need to be more accurately identified and managed to reduce the incidence of FAI in these populations.

My co-authors and I acknowledge we have no conflict of interest.

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(P100101)

A snapshot of content delivery in Australian Exercise and Sport Science undergraduate programs

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Introduction: Exercise and Sport Science (ESS) is a multidisciplinary field, with undergraduate degrees offered at most Universities in Australia,. No previous studies have explored the content of the curriculum across Australian undergraduate ESS courses, and this is important to understand as these programs respond to and shape industry trends and directions and aim to prepare graduates with broad knowledge and skills to equip them for professional work in the field or to pursue further study (e.g. postgraduate). The aim of this project is to provide a snapshot of the range of units offered in Australian ESS courses, to conceptualise the broad content that encompasses the study of ESS and the preparation of graduates in the field.

Methods: Data for this exploratory study was gathered through publicly available University course material, with 31 ESS courses included. Authors independently reviewed the description and learning outcomes of each unit of study, and grouped them according to commonalities. Only core units were included in this study (i.e., elective choices were excluded). Descriptive statistics were used to compare frequency of units across the Australian ESS programs.

Results: 65 distinct core units were identified following analysis. The 10 most common units delivered across Australian ESS programs (in order) were Biomechanics (100% of courses offered this unit), Exercise Physiology (100%), Exercise Prescription and Delivery (90%), Research Methods and Data Analysis (90%), Exercise and Sport Psychology (87%), Functional Anatomy (84%), Advanced Exercise Physiology (77%), Motor Control and Learning (71%), Advanced Biomechanics (68%), Physical Activity and Exercise for Health (68%). 55% of EXSS courses offer a Career Development unit that involves placement plus career preparation classes, and 39% of courses offer a Strength and Conditioning Unit. Sports Medicine and Injury Prevention was offered in 35% of courses.

Discussion: Australian ESS programs appear to have a strong focus on exercise-related components, which may reflect current accreditation requirements for exercise science. This shift is reflected as exercise-related courses such as Biomechanics, Exercise Physiology, Exercise Prescription and Delivery are offered more frequently than sports-focused units such as Strength and Conditioning or Sports Medicine. The literature suggests a key focus on developing soft skills (e.g., interpersonal), and ability to translate scientific knowledge to key stakeholders such as coaches to be vital for ESS practitioners, suggesting that course developers may consider offering more units such as Career Development.

Impact and application to the field: This project provides a summarised snapshot of the range of content offered across Australian ESS programs, providing a picture of what ESS is conceptualised of as in academic contexts and the content that is shaping the graduates from ESS courses and thus the profession. This knowledge helps recognise the content provided in Australian Universities, allowing future research to analyse whether these content areas and how they match professional and further study requirements. Further, this will allow academics to understand how ESS courses change in the future.

My co-authors and I acknowledge we have no conflict of interest.

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(P100107)

Macro periodisation of competition in international women's tennis: a long-term athlete development perspective

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Introduction: Competition profiles of future successful female tennis players are limited to anecdotal evidence and case reports. Consequently, Federations are challenged in providing empirically supported recommendations to players that align with previous research on ranking trajectories that distinguish future top 100 (T100) players. Accordingly, this study differentiated the international competition engagement of elite (T100 and top 250 [T250]) female tennis players during their youth (13-18y).

Methods: Historical tournament data was analysed for 258 female players from their international age of eligibility. Players were categorised into groups based on peak professional ranking of

T100 or 101-250. “Fast” or “slow” achieving T100 players were determined according to the years taken to achieve a professional T100 status. International tournament and match volumes were quantified for junior and professional categories, along with tournament distribution (i.e., days between tournaments and consecutive tournaments). Three categories of junior tournaments were defined alongside four categories of professional events. A two-way (age x ranking group) analysis of variance (ANOVA) determined the effects of respective age (13-18y) and ranking group (T100 vs. T250) on competition engagement metrics.

Results: Significant interaction effects for age and ranking group were observed for all junior and professional category tournaments ($p<0.05$). Significantly higher junior tournament volumes existed for T100 compared to T250 players at ages 14 and 15 ($p<0.05$), with greater professional tournament volumes at ages 17 and 18 ($p<0.05$). Significant interaction effects for match volumes showed higher engagement from T100 compared to T250 players at ages 14-16y ($p<0.05$). Overall match counts peaked in mid-late adolescence (i.e., 16-18y) and ranged from ≈80-110 annual matches. Significant main effects for age revealed decreased days between tournaments and increased consecutive tournaments at 15y ($p<0.05$). Specifically, an average of <3 weeks existed between tournament exposures during late adolescence.

Discussion: Accordingly, increased volume and density of tournament-play exists from age 14y in future professional female tennis players. This would likely restrict opportunities for increased dedicated training loads as recommended in holistic athlete development pathways. Further, faster achieving T100 players contest higher-quality junior and professional tournaments at earlier ages. These distinctive tournament characteristics can underpin elite pathway scheduling recommendations provided by many national tennis federations. Specifically, improvements to competition pathways for elite players may exist through these understandings of “fast” and “slow” developing T100 tennis players.

Impact and Application to the Field

- Competition schedules can be used in combination with ranking milestones to inform player selection strategies and funding from national Federations.
- Focused training exposures within the athlete development matrix from tennis Federations can be explicitly provided alongside recommended tournament periodisation that is conducive to future success.

Conflict of Interest Statement: Four of the five authors are currently employed by Tennis Australia.

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(P100108)

Determining stroke and movement profiles in competitive tennis match-play from wearable sensor accelerometry

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Introduction: The external load profile of tennis consists of repeated hitting and running actions, though appropriate technology to capture these concurrent demands are limited. Recent innovations in commercial wearable technology have revealed tennis-specific algorithms are able to detect forehand, backhand and serve stroke events alongside traditional movement metrics. Consequently, this study determined stroke and movement accelerometry metrics from a wearable sensor and compared between court surface (grass vs. hard) and match outcome (win vs. loss) during competitive tennis match-play.

Methods: Eight junior high-performance tennis players wore a trunk-mounted GPS, with in-built accelerometer, magnetometer and gyroscope during singles matches on hard and grass courts. Manufacturer software calculated accelerometer-derived total Player Load (tPL). A prototype algorithm classified forehands, backhands, serves and “other” strokes, thereby calculating stroke player load (sPL) from individual strokes. Movement player load (mPL) was calculated as the difference between tPL and sPL, with all metrics reported as absolute and relative ($\cdot min^{-1}$, %, $\cdot$ stroke). Analysis of accelerometer load and stroke count metrics were performed via a two-way (surface [grass vs. hard] x match outcome [win vs. loss]) ANOVA ($p < 0.05$) and effect sizes (Cohen's d).

Results: Respective mPL and sPL were reported at 431 ±185 and 116 ±55 arbitrary units (AU) during typical hard court match-play. No interaction effects for surface and match outcome existed for absolute tPL, mPL and sPL ($p>0.05$). Increased mPL% featured on grass courts compared to hard courts (83 ±2) vs. 79 ±5), while sPL% was increased on hard courts ($p=0.04$, $d=1.18$[0.31-2.02]). Elevated $sPL{\cdot}min^{-1}$ existed on hard courts ($p=0.04$, $d=1.19$[0.32-2.04]), but no differences in $tPL{\cdot}min^{-1}$ and $mPL{\cdot}min^{-1}$ were evident for surface or outcome ($p>0.05$). Relative forehand sPL (FH-$sPL{\cdot}min^{-1}$) was higher on hard courts ($p=0.03$, $d=1.18$[0.31-2.02]) alongside higher forehand counts ($p=0.01$, $d=1.29$ [0.40-2.14]).

Discussion: Hitting demands are heightened on hard courts from increased sPL and stroke counts. Conversely, increased mPL% on grass courts likely reflect the specific movement demands from point-play. In combination, these findings suggest that grouping the physical demands of hard and grass courts are likely inappropriate. Physical preparation strategies during training blocks can be tailored towards movement or hitting loads to suit competitive surfaces. Within grass court tournament blocks, detraining effects due to match-play exposures may be heightened due to lower time spent in point-play (i.e., reduced $sPL{\cdot}min^{-1}$) and could require supplementary drills from conditioning staff to mitigate this occurrence. Lastly, technical coaches can utilise stroke count measures to improve understandings of hitting load exposures across stroke type during competitive periods.

Impact and Application to the Field

- For sport science practitioners, load monitoring surveillance via accelerometry measures can be confidently implemented during training blocks given the sensitivity of sPL to court surface changes, which is reflective of different stroke types used and overall hitting volumes.
- Strength and conditioning staff working in tennis can maximise available training block time in targeting movement- or stroke-specific physical adaptations dependant on the competitive surface.

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The use of physical function capacity measures in the management of lower limb tendinopathy: A scoping review of expert recommendations

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