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Literature Review: Anthropometric, strength and physical capacities of senior and junior Australian footballers

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Anthropometric, strength and physical capacities of senior and junior Australian Footballers

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This study demonstrates that senior Australian Football players are heavier and possess superior strength characteristics without any meaningful difference in aerobic capacities when compared to under 18 players.

ABSTRACT

The aim of this study was to compare the anthropometric and physical characteristics of state based junior and senior Australian Football (AF) players. Thirty one League (age 23.7 ± 2.6 years), 19 Development League (DL) (age 20.5 ± 1.9 years), and 34 Under 18 (U18) players (age 17.4 ± 0.7 years) were recruited from a single AF club. Assessments included height and mass, upper body (bench press and weighted pull-up) and lower body (squat) three repetition max strength, lower body power (vertical jump) and 3 x 1-kilometre time trial. Multivariate analysis with Bonferroni post hoc tests were used to examine the differences between grades and position. Cohen's *d* statistic was used to assess the magnitude of difference. Significant age and body mass differences were evident between all three grades ($p<0.01$) and large to moderate differences were evident between League and U18 players in the absolute and relative bench press and back squat characteristics. No significant difference between time trial performance was evident between grades. The results demonstrate a particular need to ensure programs develop both absolute and relative strength in younger players to prepare them to compete safely and successfully in senior competitions.

Key Words: Australian Football, Strength, Physical Capacity, Athlete Development

Introduction

Australian Football (AF) is an invasion style team sport which requires players to possess well rounded physical characteristics. Players are required to cover large distances at varying speeds interspersed with intense accelerations, decelerations and frequent directional changes (12). Players are also frequently exposed to heavy physical contact both when in possession of the ball and when trying to win possession. The distances and intensities at which players run vary depending on competition level (4, 5). For example, Burgess et al. (5) demonstrated that elite under 18 (U18) players run significantly less distance per minute than their elite senior counterparts (118.9 ± 14.1m/min v 134.0 ± 12.1m/min respectively). In addition, the U18 players complete less sprint efforts per game and have a lower total sprint distance when compared to elite senior players (5). Strength and conditioning coaches attempting to physically prepare players for the rigours of competition should consider both acute performance demands and the long-term development goals of adolescent players to ensure they are prepared for senior adult competition.

There are several pathways through which junior players can progress into the senior elite Australian Football League (AFL), such as the elite national U18s competition and state based underage competitions (8). The most talented underage players are typically recruited into the elite AFL while those who are not selected often continue to compete in senior semi-elite competitions. Due to the dynamic nature of match play in AF, strength and conditioning coaches attempt to develop player's athletic strength, power and aerobic energy systems to optimise performance and prevent injury. Currently, an abundance of research is available highlighting differences in aerobic and power characteristics between age-matched players of differing playing status (9, 22, 23). Recently research has also demonstrated discrepancies between the functional movement capacities of junior and senior AF players using the Athletic Ability Assessment (11, 24). At present, there is limited research exploring whole body strength changes between playing position and competition levels (3, 6, 25). Bilsborough, et al., (3) demonstrated that strength and power differences exist between junior and senior players competing in semi-elite and elite AF players. In-particular, differences were noted between one repetition maximum (1RM) relative bench pull and loaded squat jump performance (3). To the authors

knowledge, currently there is no information available detailing the lower body strength of underage AF players, a property considered important for performance and reducing injury risk (26).

Typically, playing positions can be broken into nomadic (midfielders, half backs and forwards and pocket players) and non-nomadic (ruck, centre half forward and back and full forward or back) positions. It has previously been shown that anthropometric and physical characteristics differ between playing positions in AF (17, 19). Further AF research has also identified significant differences between playing position, match movement demands and match performance indicators (13). Senior elite non-nomadic players have been shown to be taller, heavier, stronger and more powerful while nomadic players are typically smaller, fitter and more agile (17, 19). It is currently unclear if strength characteristics differ between positions at the junior level. The primary purpose of this study was to assess the anthropometric and physical characteristics of semi-elite junior and senior AF players. It was hypothesised that senior players would possess superior performance qualities relative to their junior counterparts. A secondary aim of the study was to explore how physical characteristics differed between playing positions.

Approach to the Problem

This cross-sectional investigation compared the anthropometric, upper and lower body strength, lower body power and aerobic capacity of U18 and senior AF players from a single semi-elite AF team. In total 84 players were recruited from three grades of a single club. Players completed a battery of tests including anthropometric assessment, countermovement jump (CMJ), three repetition maximum (3RM) strength testing and a 3 x 1-kilometre time trial. All testing was completed in the final weeks of the preseason preparation phase. To reduce the effects of fatigue on performance the testing was completed across three sessions over a two-week period. Session one assessed anthropometric, 3RM pull-up and squat. The second session assessed CMJ and 3RM bench press. The time trial was completed in the final session. Prior to each testing session players completed a general warm-up, consisting of light jogging, unilateral and bilateral countermovement jumps and dynamic stretching. Session warm-ups and assessments were all monitored and recorded by the clubs strength and conditioning staff.

Subjects

Thirty one League (age 23.7 ± 2.6 years, mass 84.9 ± 9.2 kg, stature 1.86 ± 0.07 m), 19 DL (age 20.5 ± 1.9 years, mass 80.9 ± 9.6 kg, stature 1.82 ± 0.07 m), and 34 U18 players (age 17.4 ± 0.7 years, mass 77.0 ± 9.2 kg, stature 1.82 ± 0.06 m) were included in the study. Players were classified based on their highest level of selection at the club and as either nomadic or non-nomadic based on the position played most frequently.

During the preseason the League and DL players typically completed 2-3 resistance training sessions and 2 mixed skills/conditioning sessions per week. The U18 players had progressed through a series of strength education and screening processes to ensure sound technique in their strength assessments. Any player that did not pass the screening process was not included in the study. The U18 players typically completed 2 resistance training sessions and 2 mixed skills/conditioning sessions a week. Senior and junior resistance training programs utilised common variations of strength (squat, deadlift, bench press and pull-up), plyometric and prophylactic exercises. The methods for this study were approved by the university ethics committee and by the club involved. Players were provided with plain language statements detail the relevant risks and benefits of taking part in the study and were required to provide consent for their data to be included. If the player was under the age of eighteen consent was also required by their legal guardian.

Procedures

Anthropometric measures of stature and mass were measured to the nearest 0.01 m and 0.1 kg using a stadiometer (PE, Sportforce, Australia) and electric scales (Model UC-321, A&D Mercury Pty. Ltd., Australia). Lower body power was assessed via a countermovement jump (CMJ). Players were instructed to stand under a Vertec vertical jump device (Swift Performance Equipment, Lismore, Australia), then with both feet flat on the ground reach up and displace the highest vane possible. Players were then asked to perform three CMJ's with two minutes rest between jumps. The highest of the three attempts were recorded minus the individuals reach height. The interclass correlation coefficients and typical error measurements were 0.98 and 1.64% respectively.

All strength measures of back squat, bench press and pull-up were assessed to a 3RM using standard Olympic bars and free weights. After the general warm-up players completed a specific warm-up protocol using the player's previous 3RM data for each of the prescribe lifts. Players completed 8 repetitions with the bar (20kg or body weight), 6 repetitions at 60% of 3RM, 4 repetitions at 70% of 3RM, 3 repetitions at both 80% and 90% of 3RM, followed by 3 repetition maximum testing. If successful on the 3RM attempt players were instructed to incrementally increase the loads by 2.5 kg with three to five minute rest period between each attempt. The bench press protocols required players to self-select handgrip width and lower the bar to touch the chest then press the bar into full elbow extension. Pull-up protocols required players to complete the movement with over-hand position at a self-selected handgrip width. Players began the movement in a fully extended hanging position and were required to pull themselves to a height in which the chin was level with the bar. Players were verbally encouraged to limit swinging movements, with excessive swinging disqualifying the attempt. The back squat protocols required players to attain a depth in which the hip crease aligned with the top of the knee. Players could self-select stance width. Adherence to testing protocols was assessed by the club's strength coaches, with failure to complete a repetition to required range resulting in the attempt being disqualified. Testing was terminated if players failed on a particular movement twice.

The club's 3 x 1-kilometre time trials is a novel assessment of aerobic capacity as more commonly 3-kilometre time trials or Multi-Stage Fitness Tests (MSFT) are used in AF literature (10, 16, 18). The 3 x 1-kilometre time trial requires players to complete each 1-kilometre trial as quickly as possible running around a grassed oval. Each subsequent trial began 7:30 minutes after the start of the preceding trial. The total time taken to complete the three trial represented the criterion measure. The club uses the repeated trial protocols for three reasons; firstly there is a strong correlation ($r=-0.82$, $p<0.01$) and agreement (Figure 1) between time trial and MSFT performance measures. Test-retest reliability assessed using interclass correlation coefficients (ICC=0.97, $p<0.01$) and typical error measurements (4.36%) are also considered acceptable. Secondly, the higher average running speeds elicited in the repeated trial protocols better represents the high intensity running zone ($<250 m/min^{-1}$) which has been linked to winning possession of the ball more frequently in AF (15). For example, the

3-kilometre time trial results previously reported using a similar demographic averaged 252.8 m/min-1 (16) while the average speed of the players in the 3 x 1-kilometre time trial in this study was 283.0 m/min^{-1}. Finally, coaches expect players in matches to perform high intensity short bursts of effort interspersed with frequent short breaks on the bench to recover (often time recovering on the bench is <3 min). The repeated trial protocols resulted in an average rest period less than 4 min and is deemed by coaches to be more representative of the game environment than the standard 3-kilometre time trial.

Statistical Analysis

All data is reported as means ± *SD.* Parametric assumptions of normality and homogeneity of variance were tested before all analyses. Multivariate analysis (MANOVA) with Bonferroni post hoc tests were run to examine the differences between grades (League, DL, U18). Similarly, an MANOVA was used to examine the differences between nomadic and non-nomadic players across the different grades. The magnitude of effects were examined using the Cohen's *d* effect size (7). The magnitude of effect was interpreted using a scale where values <0.2 are deemed trivial, 0.2–0.6 small, 0.6–1.2 moderate, 1.2–2.0 large and >2.0 very large (14). Statistical significance for all analyses was defined as $p<0.05$.

RESULTS

Significant age and body mass differences were evident between all three grades ($p<0.01$, Table 1), however there was no notable height differential between grades. There were no notable differences in CMJ's between grades. Small to large differences (range, $d= 0.67$-1.48) were evident between grades in the absolute and relative bench press, absolute pull-up and back squat characteristics. Bench press was the only strength test where League players significantly outperformed the DL players with both the absolute ($d=0.89$) and relative ($d=0.45$) performances superior. There was a large difference between the League and U18 ($d=1.95$) and the DL and U18 ($d=1.39$) players for total weight lifted. No meaningful differences were evident in time trial performance between groups.

***** TABLE 1 AROUND HERE*****

Players classified as nomadic demonstrated moderate to very large differences (range, *d*= 1.13-3.85, Table 2) between all grades for age and body mass characteristics. Moderate to very large differences (range, *d*= 1.11-2.46) were evident between grade for all absolute strength measures, with the exception of back squat which demonstrated a large difference between League and U18 players (*d*= 1.64). Total weight lifted varied between League and U18 (*d*=2.05) and DL and U18 (*d*=1.42) players.

***** TABLE 2 AROUND HERE*****

There was a very large difference in the ages of the non-nomadic League (*d*=3.39) and DL (*d*=2.57) groups when compared to the U18 group. In regards to anthropometry, the only significant difference between groups was the moderate difference (*d*=1.15) between the League and U18 players. The non-nomadic League and U18 players demonstrated moderate to large differences (range, *d*= 1.09-1.40) in bench press and back squat performance. Relative measures of bench press and back squat demonstrated moderate differences (*d*= 1.07) between the League and U18 players and large differences (*d*= 1.64) between the DL and U18 respectively. Total weight lifted between league and U18 players demonstrated a moderate difference (*d*= 1.48).

***** TABLE 3 AROUND HERE*****

DISCUSSION

As hypothesised the differences between age and body mass between League and U18 players concurs with previous research which also reported that elite and sub elite seniors were older and heavier than their elite junior counterparts (3, 21). Interestingly, despite the League players being on average much older and heavier than their DL and U18 counterparts, no differences in height between the groups were noted. This likely due to the majority of these players being at or close to full biological maturity and as such they would have already attained full adult height.

The significant difference demonstrated in upper body strength between League, DL and U18 is in agreement with previous research in both AF and rugby union (1, 3, 25). Similar strength trends were also demonstrated when participants were analysed by playing positions, with the exception of

non-nomadic DL players who demonstrated small to moderate differences when compared to league and U18 players. Direct comparisons to other studies is difficult however Bilsborough et al. (3) demonstrated that semi-elite senior AF players possessed superior upper body strength (96.5 ± 16.6kg) when compared to junior counterparts (87.9 ± 12.7kg) in one repetition maximum bench press values. Differences in bench press performance between the two studies may be a result of variation in testing protocols, player age and specific training foci of individual teams. To the authors' knowledge this was the first study to report lower body strength characteristics of junior and senior AF players. Lower body strength results showed a similar trend to results reported of rugby union players with senior players possessing advanced strength characteristics over their junior counterparts (1).

The difference in strength and body weight demonstrated between groups are likely due to physical maturity and adaptions associated with increased training age. Training age refers to the duration of time players have spent within a supervised and monitored training program (1). Recent research examining training age in adolescent rugby league demonstrated that strength gains occur annually when involved in formalised training programs and that the training age of individuals was a likely reason for these strength improvements (20). Whilst not quantified in this study, the League players had generally been involved in club talent development programs since their early teenage years with formalised strength training beginning in the U18 program. Therefore it can be presumed that the League players, who are significantly older, have a greater training age than DL and U18 players. Long-term participation in structured strength training, can improve performance in force and power tasks by increasing muscle hypertrophy, inhibition of force regulators (2) and movement efficiency (e.g., greater synchronization of motor units and decreased antagonist co-activation) (24). The development of both absolute and relative strength may help to safeguard athletes against injury as match movement velocities and distances increase from junior to senior competition (5) and may provide competitive advantage in contested situations.

The influence of aerobic capacity on match performance in senior AF is generally well understood (15, 16). As such, many AF development training programs place a high emphasis on developing aerobic capacity. In the current study this is particularly evident by the small improvements

in time trial performance when comparing League and U18 players. This represents a much smaller magnitude of improvement than evident in strength measures and is likely due to a prioritisation on running capacity in junior training programs. As a result, it would appear the scope for improvement in running capacity appears to be relatively low once junior players reach the U18 level. Currently it is unclear if strength characteristics influence match performance in AF. As such it is debatable if the emphasis often placed on developing running capacities in junior AF training is truly warranted. Future research should explore links between strength and match performance to further inform the development of junior training methods in AF.

There are limitations in the study methodology that need to be acknowledged. Firstly, the cross-sectional design means all data comes from a single club during preseason which potentially limits the application of the results. Future work should seek to longitudinally track players as they progress from junior to senior competition and compare in-season and preseason results. Secondly, the clubs 3 x 1-kilometre time trial has yet to be validated against match performance outcomes. Future research could explore the relationship between the time trial measure and match performance in comparison to other commonly used fitness measures.

PRACTICAL IMPLICATIONS

This work demonstrates that semi-elite League AF players are significantly older, heavier and stronger in both upper and lower body measures than their U18 counterparts. No significant differences are evident between time trial performances between groups. In AF formalised strength training is often not included in junior training programs until they reach U18s; rather developing aerobic capacity is prioritised. As such, smaller scope for improvement in running capacity are likely to be evident when players progress into senior competition when compared to strength outcomes. This study highlights a practical need to ensure strength and conditioning coaches provide formalised strength programs to U18 AF players to ensure the appropriate physical development for senior levels of competition.

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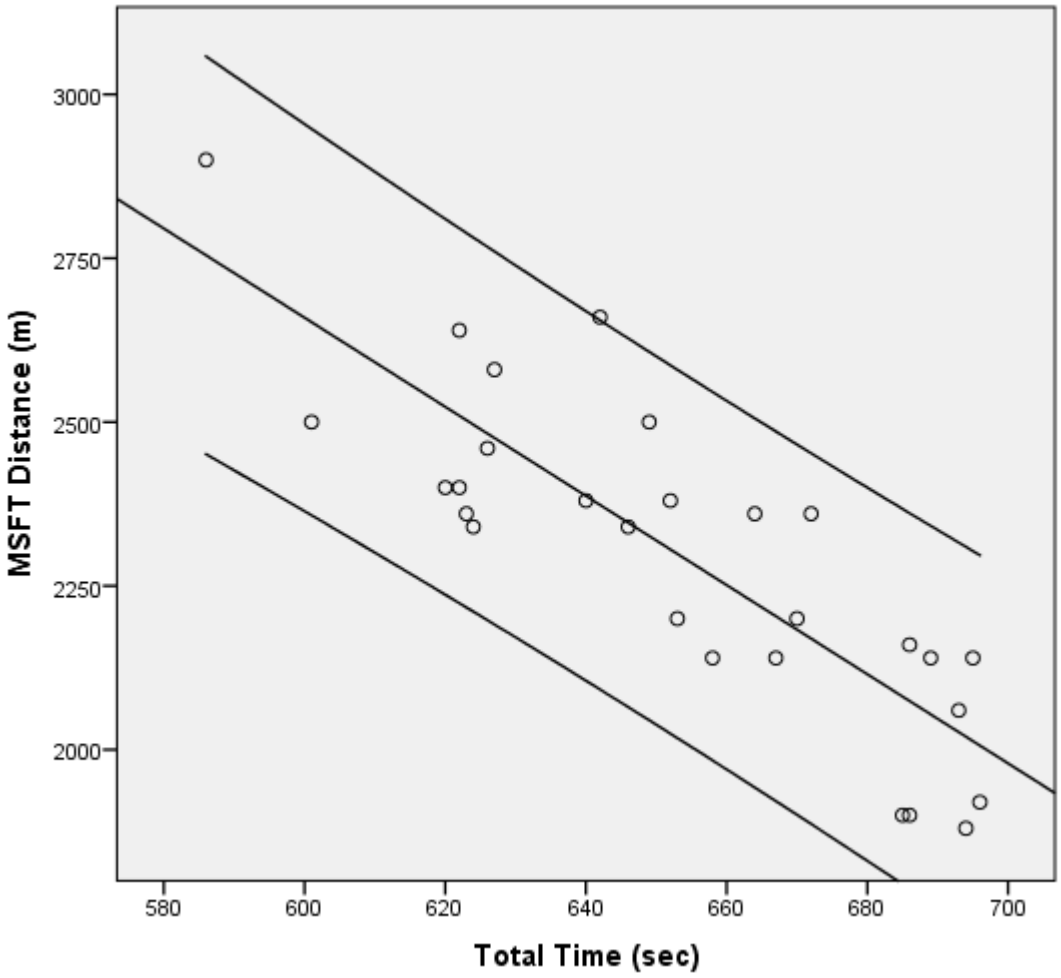

Figure 1. Bland-Altman plot with 95% prediction intervals.

Table 1. Anthropometric and physical capacities of League, Development League (DL) and Under 18 (U18) Australian Football players (mean (SD)).

	League	DL	U18	Main Effect *p*	Cohens *d* (95% CI) League v DL	Cohens *d* (95% CI) League v U18	Cohens *d* (95% CI) DL v U18
Age (years)	23.8 (2.8)‡§	20.7 (2.0)†§	17.4 (0.7)†‡	<0.01	1.23 (0.59-1.82)	3.2 (2.44-3.90)	2.51 (1.74-3.20)
Height (m)	1.86 (0.07)	1.82 (0.07)	1.82 (0.06)	0.10	0.57 (-0.02-1.14)	0.62 (0.11-1.11)	0.01 (-0.56-0.56)
Body Mass (kg)	85.9 (8.1)§	80.3 (7.7)	75.5 (7.6)†	<0.01	0.70 (0.11-1.28)	1.33 (0.77-1.85)	0.63 (0.05-1.19)
CMJ (m)	0.62 (0.07)	0.63 (0.05)	0.59 (0.05)	0.13	-0.16 (-0.73-0.42)	0.50 (0.01-0.99)	0.80 (0.21-1.37)
Bench Press (kg)	93.2 (14.2)‡§	81.4 (12.2)†§	67.4 (11.9)†‡	<0.01	0.88 (0.27-1.46)	1.98 (1.36-2.54)	1.17 (0.55-1.75)
Back Squat (kg)	113.4 (19.6)§	110.0 (17.0)§	89.2 (11.4)†‡	<0.01	0.18 (-0.39-0.75)	1.53 (0.96-2.06)	1.52 (0.87-2.13)
Pull-Up (kg)	103.2 (11.7) ‡§	97.4 (12.8)†§	89.0 (8.5)†‡	<0.01	0.48 (-0.11-1.05)	1.40 (0.84-1.92)	0.82 (0.23-1.39)
Bench Press ($kg \cdot kg^{-1}$)	1.09 (0.16)‡§	1.02 (0.15)†§	0.89 (0.11)†‡	<0.01	0.45 (-0.14-1.02)	1.47 (0.90-2.00)	1.04 (0.43-1.61)
Back Squat ($kg \cdot kg^{-1}$)	1.32 (0.21)	1.38 (0.24)§	1.19 (0.18)‡	0.02	-0.27 (-0.84-0.31)	0.67 (0.16-1.16)	0.93 (0.33-1.51)
Pull-Up ($kg \cdot kg^{-1}$)	1.22 (0.13)	1.24 (0.13)	1.18 (0.06)	0.23	-0.15 (-0.72-0.42)	0.40 (-0.10-0.89)	0.66 (0.07-1.22)
Total Weight (kg)	307.4 (37.4)§	286.8 (34.7)§	242.4 (28.8)†‡	<0.01	0.57 (-0.02-1.14)	1.96 (1.35-2.53)	1.43 (0.79-2.03)
Time Trial (sec)	621.9 (33.1)	641.6 (50.5)	634.7 (35.0)	0.27	-0.49 (-1.06-0.10)	-0.38 (-0.86-0.12)	0.17 (-0.4-0.73)

CMJ = counter movement jump
† significantly different to League
‡ significantly different to DL
§ significantly different to U18

Table 2 Anthropometric and physical capacities of Nomadic League, Development League (DL) and Under 18 (U18) Australian Football players (mean (SD)).

	Nomadic						
	League	DL	U18	Main Effect *p*	Cohens *d* (95% CI) League v DL	Cohens *d* (95% CI) League v U18	Cohens *d* (95% CI) DL v U18
Age (years)	24.2 (2.9)‡§	19.9 (1.1)†§	17.2 (0.7)†‡	<0.01	1.72 (0.71-2.63)	3.22 (2.11-4.18)	3.16 (1.82-4.27)
Height (cm)	1.82 (0.05)	1.78 (0.04)	1.79 (0.03)	0.04	0.85 (-0.05-1.69)	0.72 (-0.02-1.41)	-0.30 (-1.15-0.58)
Body Mass (kg)	82.1 (5.7)‡§	76.4 (4.6)†§	72.6 (4.7)†‡	<0.01	1.06 (0.14-1.91)	1.81 (0.94-2.58)	0.81 (-0.1-1.67)
CMJ (m)	0.63 (0.06)	0.62 (0.05)	0.6 (0.06)	0.28	0.18 (-0.67-1.01)	0.50 (-0.22-1.19)	0.35 (-0.52-1.2)
Bench Press (kg)	90.7 (12.7)‡§	79.4 (6.8)†§	64.0 (9.1)†‡	<0.01	1.01 (0.09-1.85)	2.39 (1.43-3.23)	1.83 (0.77-2.76)
Back Squat (kg)	114.3 (18.2)§	105.0 (16.7)	90.0 (11.3)†	<0.01	0.52 (-0.35-1.36)	1.58 (0.75-2.33)	1.12 (0.17-2.00)
Pull-Up (kg)	102.6 (11.0)‡§	90.8 (9.0)†	85.8 (6.3)†	<0.01	1.13 (0.20-1.99)	1.84 (0.97-2.62)	0.68 (-0.22-1.54)
Bench Press ($kg \cdot kg^{-1}$)	1.11 (0.16)§	1.04 (0.06) §	0.88 (0.11)†‡	<0.01	0.51 (-0.36-1.34)	1.66 (0.81-2.41)	1.66 (0.63-2.58)
Back Squat ($kg \cdot kg^{-1}$)	1.39 (0.2)	1.38 (0.24)	1.24 (0.17)	0.09	0.05 (-0.80-0.89)	0.80 (0.06-1.50)	0.71 (-0.19-1.57)
Pull-Up ($kg \cdot kg^{-1}$)	1.26 (0.14)	1.26 (0.1)	1.18 (0.06)	0.07	0.01 (-0.84-0.84)	0.73 (-0.01-1.42)	1.06 (0.11-1.93)
Total Weight (kg)	305.3 (39.5)‡§	271.3 (22.3) †§	236.3 (26.7)†‡	<0.01	0.97 (0.06-1.81)	2.02 (1.13-2.82)	1.38 (0.39-2.27)
Time Trial (sec)	612.6 (26.6)	620.5 (33.3)	624.2 (33.1)	0.56	-0.27 (-1.11-0.58)	-0.39 (-1.08-0.32)	-0.11 (-0.97-0.75)

CMJ = counter movement jump
† significantly different to League
‡ significantly different to DL
§ significantly different to U18

Table 3Anthropometric and physical capacities of Non-Nomadic League, Development League (DL) and Under 18 (U18) Australian Football players (mean (SD)).

	Non- Nomadic						
	League	DL	U18	Main Effect *p*	Cohens *d* (95% CI) League v DL	Cohens *d* (95% CI) League v U18	Cohens *d* (95% CI) DL v U18
Age (years)	23.1 (2.4)§	21.7 (2.5)§	17.7 (0.7)†‡	<0.01	0.57 (-0.49-1.57)	2.74 (1.24-3.95)	2.18 (0.62-3.40)
Height (cm)	1.92 (0.05)	1.88 (0.05)	1.89 (0.05)	0.25	0.80 (-0.29-1.80)	0.60 (-0.46-1.60)	-0.20 (-1.32-0.95)
Body Mass (kg)	92.3 (7.6)§	85.7 (8.2)	82.9 (8.7)†	0.08	0.84 (-0.25-1.85)	1.17 (0.03-2.19)	0.33 (-0.83-1.44)
CMJ (m)	0.61 (0.08)	0.64 (0.05)	0.58 (0.04)	0.36	-0.42 (-1.42-0.62)	0.44 (-0.61-1.44)	1.33 (-0.01-2.46)
Bench Press (kg)	97.5 (16.4)§	84.2 (17.4)	75.8 (14.6)†	0.04	0.79 (-0.29-1.79)	1.38 (0.19-2.41)	0.52 (-0.67-1.63)
Back Squat (kg)	112.0 (22.6)§	116.7 (16.3)	87.3 (12.5)†	0.03	-0.23 (-1.23-0.8)	1.26 (0.10-2.28)	2.02 (0.51-3.22)
Pull-Up (kg)	105.8 (13.6)	103.9 (10.4)	95.1 (9.1)	0.14	0.15 (-0.87-1.16)	0.88 (-0.22-1.88)	0.90 (-0.35-2.01)
Bench Press ($kg \cdot kg^{-1}$)	1.06 (0.16)§	0.99 (0.22)	0.91 (0.12)†	0.27	0.38 (-0.66-1.38)	1.02 (-0.10-2.03)	0.45 (-0.73-1.56)
Back Squat ($kg \cdot kg^{-1}$)	1.21 (0.2)	1.38 (0.25)§	1.06 (0.14)‡	0.04	-0.78 (-1.78-0.31)	0.83 (-0.26-1.83)	1.58 (0.18-2.73)
Pull-Up ($kg \cdot kg^{-1}$)	1.14 (0.07)	1.2 (0.16)	1.17 (0.05)	0.53	-0.54 (-1.54-0.52)	-0.47 (-1.47-0.58)	0.25 (-0.90-1.37)
Total Weight (kg)	315.3 (42.0)§	301.7 (36.6)	260.2 (30.8)†	0.01	0.34 (-0.70-1.34)	1.44 (0.24-2.47)	1.23 (-0.09-2.35)
Time Trial (sec)	637.8 (38.3)	669.7 (58.5)	661.0 (25.7)	0.31	-0.69 (-1.68-0.39)	-0.68 (-1.67-0.40)	0.19 (-0.96-1.31)

CMJ = counter movement jump
† significantly different to League
‡ significantly different to DL
§ significantly different to U18