

Supplementary Table S1. The collected data from the literature review. Note that „Results of the testing” and „Study conclusions” are in most cases direct quotes from the studies. “Ref” numbers match the numbering in the main text. “Web view” is recommended to view this document.

| Ref | Author and date                                                              | Applied physical tests                                                                                                                                   | Groups of participants                                                                            | Age and size of groups                                                                                                        | Results of the testing                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Study conclusions                                                                                                                                                                                                                                                                                                                    |
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| 1   | Jakovljevic, S.; Karaleji , M.; Pajj , Z.; Mandi , R. (2011)                 | 20-m sprint;<br>T-test                                                                                                                                   | 35 basketball players from First Bulgarian Basketball League, grouped by inner and outer position | - outer players: n=22, age 20.90 ± 2.09 years<br>- inner players: n=13, age 22.15 ± 3.91 years                                | No statistically significant differences between the two groups of players in the acceleration and agility variables. High correlations between: T5m, T10m and T20m and TT- correlation coefficients of .666 to .819 at the significance level of .01. Medium correlations between body height and acceleration variables - correlation coefficients of .306 to .383, at the significance level of .05, while the correlation coefficients between body mass and these variables are slightly higher .350 to .415 at the significance level of .01, or .05.                                                                                                                                             | Basketball significantly involves a linear sprinting (acceleration), as well as changes of direction. Apply acceleration and agility exercises in training and testing.                                                                                                                                                              |
| 2   | Pojskic, H.; Separovic, V.; Uzicanin, E.; Muratovic, M.; Mackovic, S. (2015) | CMJ;<br>20 m shuttle run test;<br>Running-based Anaerobic Sprint Test (RAST) (6 x 35 m intermittent sprints)                                             | 55 healthy basketball players from four teams of the Bosnian Premier League, grouped by position  | - guards: n=22, age 19.36 ± 3.54 years<br>- forwards: n=19, age 18.21 ± 2.65 years<br>- centers: n=14, age 19.86 ± 2.98 years | VO2max was significantly higher (p < 0.01) in guards and forwards than in centers. The CMJ height and CMJ Relative Peak Power Output were higher (p < 0.01) in guards than in centers, while CMJ Peak Power Output was higher (p < 0.05) in centers. All RAST absolute values were higher (p < 0.01) in centers than in guards and forwards, while the relative values were higher (p < 0.01) in guards in comparison to forwards and centers. The RAST fatigue index was smaller (p < 0.01) in guards and forwards than in centers.                                                                                                                                                                    | The findings of the present study suggest that aerobic and anaerobic power and capacities can be good discriminative variables between players with different positional roles.                                                                                                                                                      |
| 3   | Boone, J.; Bourgois, J. (2013)                                               | Anthropometry;<br>incremental running tests;<br>5-m, 10-m, 5x5-m sprints;<br>squat jump and CMJ;<br>isokinetic strength test                             | 144 from Belgian first division, grouped by position: PG, SG, SF, PF, C; all males                | mean age for all groups: 26.4 ± 5.3 years                                                                                     | Center slower than other positions, for 5x10m point guards and shooting guards were faster than the others, for jump tests centers displayed sign. lower absolute performance than others. Point and shooting guards had higher VO2peak and speed at the anaerobic threshold. The isokinetic strength test showed that the quadriceps muscle group of center could exert a higher torque during knee extension                                                                                                                                                                                                                                                                                          | In elite basketball the impact of individualized and specialized training according to player position in combination with the individual physiological profile grows.                                                                                                                                                               |
| 4   | Köklü, Y.; Alemdaroglu, U.; Kocak, F.U.; Erol, A.E.; Findikoglu, G. (2011)   | Anthropometry;<br>multi-stage 20 m shuttle run;<br>isokinetic leg strength;<br>squat jump;<br>CMJ;<br>10-m and 30m single-sprint;<br>drill agility tests | 45 professional Turkish basketball players, grouped by division or by position; all males         | - guards: n=14, age 22.9 ± 3.7 years<br>- forwards: n=15, age 22.5 ± 3.9 years<br>- centers: n=16, age 24.5 ± 4.1 years       | First division players’ CMJ - significantly higher than second division players’ (p≤0.05). Second division players’ 10 m sprint times were significantly better than those of first division players’ (p≤0.05). Forwards and centers were significantly taller than guards. Centers were significantly heavier and their T-drill test performances were inferior to those of forwards and guards (p≤0.05). Guards had a significantly higher maximal oxygen uptake (VO2max) than centers. Guards and forwards showed significantly better performance in the 10 and 30 m sprint tests than centers (p≤0.05). Forwards and centers had significantly better left leg flexor strength at 180°/s (p≤0.05). | physical performance of professional basketball players differ among guards, forwards, and centers, while they do not differ significantly between first and second division players. According to the present study, particular court positions have different demands and specific physical attributes in professional basketball. |

| Ref | Author and date                                                                                                       | Applied physical tests                                                                                                                     | Groups of participants                                                                         | Age and size of groups                                                                                             | Results of the testing                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Study conclusions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
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| 5   | Strumbelj, B.; Vuckovic, G.; Jakovljevic, S.; Milanovic, Z.; James, N.; Erculj, F. (2015).                            | 30-15 intermittent fitness test                                                                                                            | 24 senior players from national teams of Slovenia and Serbia, grouped by position; all females | - guards: n=8, age 25.5 ± 3.1 years<br>- forwards: n=8, age 25.0 ±3.1 years<br>- centers: n=8, age 25.6 ±4.2 years | No significant differences were found for any of the measures between the three playing positions.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Other physiological parameters, e.g., anaerobic capacity, vertical jump, and peak sprint speed, may account for differences in basketball performance, particularly interpositional, and should be measured in future studies.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 14  | Reina Román, M.; Garcia-Rubio, J.; Feu, S.; Ibanez, S.J. (2019)                                                       | External training load measured during 8 matches and 22 training practices                                                                 | 10 amateur, Spanish basketball players; all females                                            | age: 21.7 ± 3.65 years                                                                                             | The results obtained showed that the load experienced during competition was significantly higher (p < 0.001) than during training (Heart Rate, Player Load, Steps, Jumps, and Impacts). There were also differences according to playing positions, mainly between the backcourt and frontcourt players (p < 0.001).                                                                                                                                                                                                                                                                                                    | The players must work in higher areas of heart rate during training, mainly in Z4 and Z5, increasing their HRmax and HRavg. The training doesn't equal the load supported and the distance performed in competition, so it is necessary to pay more attention during training. This                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 15  | Heishman, A.D.; Daub, B.D.; Miller, R.M.; Freitas, E.D.S.; Bemben, M.G. (2020)                                        | External training load measured during practice; CMJ                                                                                       | 14 NCAA Division I collegiate basketball players; all males                                    | age 19.7 ± 1.0 years male                                                                                          | PlayerLoad per minute was significantly higher during Week (W)1 and W2, compared to subsequent weeks, but no additional differences in eTL parameters across time were observed. Scholarship athletes displayed greater PlayerLoad, with no observed differences in eTL by position. Moderate decreases in FT:CT and RSI- Mod paralleled increased eTL. Significant increases in practice in- tensity (W1 and W2) did not impact CMJ performance, suggesting athletes could cope with the prescribed training loads. However, moderate perturbations in FT:CT and RSIMod paralleled the weeks with intensified training. | The significant increases in eTL parameters for Scholarship athletes suggests coaches may need to monitor and manage these athletes with different strategies to maintain fitness and for guiding return-to-play and return-to- performance protocols following injury. Additionally, the lack of positional differences suggests that coaches may not need to stratify teams by position in load monitoring strategies, however coaches should examine the differences among their squad individually, as they may vary de- pending upon style of play and player personnel. Finally, the present study suggests JH may lack the sensitivity to detect alterations in eTL, while FT:CT and RSIMod may be more useful in monitoring neuromuscular performance, as athletes may modify their movement strategy to achieve a desired JH. |
| 19  | Begu, B.; Kryeziu, A.R.; Bahtiri (2018)                                                                               | Anthropometry; Agility T-test; Ball dribble between cones (zig-zag) 20 m                                                                   | 84 cadet players; all males                                                                    | age 14-15 years                                                                                                    | The impact of anthropometric variables (predictor) with T-test as criterion is important at P = .008 level.<br>the influence is low in the variables of the thigh, height body and foot length.<br>The influence of anthropometric variables as a predictor in the dribbling test of the 20-meter ball was significant at P = .006.<br>All variables separately impacted the drift test of 20 meters.                                                                                                                                                                                                                    | anthropometric variables have no effect on the results of basketball players of this age on the two agility tests                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 20  | Palheta, C.E.; Milan, F.J.; Soares, A.L.; Miguel, C.G.; Collet, C.; Mendes, F.G.; Milistetd, M.; Carvalho, H.M (2019) | Anthropometry; NBA's Draft Combine test (lane agility drill, shuttle run, three quarter sprint, standing vertical leap, max vertical leap) | 405 NBA athletes                                                                               | 21 .5 ± 1 .46 years, male                                                                                          | There was a substantial negative influence of body dimensions on the results achieved by players in the NBA's Draft Combine testing battery (i.e., smaller players had better performances).                                                                                                                                                                                                                                                                                                                                                                                                                             | It may be more insightful to interpret players test performance accounting appropriately for size differences, likely allowing for better decisions on prediction of players' future performance. For this allometric scaling is an appropriate modeling approach, whereas commonly used ratio standards should not be used at all                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

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| 21  | Portes, R.; Navarro, R.M.; Sosa Marín, C.; Trapero, J.J.; Jiménez Saiz, S.L. (2019) | various (this is a review)                                                                                                                                                                                   | 29 scientific papers                                          | -                                                                                                                             | External load measures should be monitored, interpreted and compared to internal load measures to take decisions regarding changes in training programs and competition strategies. Changes of direction and acceleration/deceleration ratio correlate positively with Player Load. Perimeter players decelerate the most out of all the players on the court, which means higher player load. The risk of injury is highly related to the ability to decelerate at high intensity and the capability of recovering from these decelerations. | Repeating linear sprinting and intensity actions are crucial to meet the demands of the sport of basketball. Therefore, including them in conditioning programs seems crucial in order to meet game demands. Male players seem to have similar demands than female players of the same or similar levels of competition, therefore training programs could also include similar content for both. Training processes should be individualized by position in order to reproduce competition demands during training. Reducing the number and duration of practices seems to have a positive impact on the reduction of injuries by reducing the load on players . It is crucial to reach an intermediate point when talking about load management as unloaded players seem to be at a similar risk of injury to those players experiencing high amounts of load. |
| 22  | Sarvestan, J.; Cheraghi, M.; Shirzad, E.; Svoboda, Z (2019)                         | CMJ                                                                                                                                                                                                          | basketball players, grouped by elite or collegiate; all males | - elite: n=12, age 24.3±5.9 years<br>- collegiate: n=12, age 21.6±2.5 years                                                   | concentric Relative Peak Force (r=0.71), Relative Peak Power (r=0.83), Peak Velocity (r=0.99) and MRSI (r=0.71) in elite players, and concentric Relative Peak Force (r=0.79), Average Power (r=65), Relative Peak Power (r=0.81), Peak Velocity (r=0.98) and MRSI (r=0.83) in collegiate players were significantly correlated with JH.                                                                                                                                                                                                      | The study highlights the importance of absolute and relative measures of force and power in order to achieve higher jumps among basketball players.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 23  | Erculj, F.; Blas, M.; Coh, M.; Bracic, M. (2009)                                    | Anthropometrics;<br>Countermovement jump;<br>Drop jump (25 cm)<br>20 m sprint; 20 m sprint dribble<br>6 x 5 m sprint; 6 x 5 m sprint dribble<br>Basketball throw (size number 6); Medicine ball throw (2 kg) | 65 basketball players from 27 European countries; all females | - guards: n=35, age 14.49 ± 0.61 years<br>- forwards: n=14, age 14.57 ± 0.65 years<br>- centers: n=16, age 14.44 ± 0.63 years | The initial MANOVA was significant (Wilks λ=.53, F(16,100)=2.35, p=.005) which shows there were differences between the positions. The discriminant ratio coefficients suggest that the best variable for distinguishing between the positions is the 20m sprint, followed by the basketball throw, 6 x 5m sprint and medicine ball throw                                                                                                                                                                                                     | The player types were markedly differentiated in terms of their body height and body mass. The differences were also established in most of the measured motor abilities. They were not only a consequence of the differences in body height but also of the different playing roles assigned to the individual types of players as well as of the required technical skills.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 24  | Scanlan, A.T.; Tucker, P.S.; Dalbo, V.J. (2014)                                     | Linear speed: 3x20m sprints;<br>Closed-skill agility: 6 x change of direction speed test trials;<br>Open-skill agility: 12 x reactive agility test trials                                                    | 12 semiprofessional players, grouped by position; all males   | - backcourt: n=6, age 24.3 ± 7.9 years<br>- frontcourt: n=6, age 27.5 ± 5.5 years                                             | Magnitude-based inference analyses revealed that backcourt players possessed likely superior sprinting ability than front-court players. In contrast, frontcourt players were observed to possess possible quicker change of direction speed than backcourt players. Furthermore, unclear group differences were found between playing positions for open-skill agility properties.                                                                                                                                                           | Position-targeted speed development programs might necessitate inclusion as a fundamental part of the conditioning plan, as opposed to a more traditional team training focus. Specifically, position-targeted speed training might (a) better develop relevant phases of sprinting in frontcourt players during the preseason phase; and (b) ensure maintenance or improvement of speed qualities in backcourt players across seasonal phases when team training predominates.                                                                                                                                                                                                                                                                                                                                                                                  |

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| 25  | Erculj, F.; Jakovljevic, S (2011)                                                                                 | Anthropometrics;<br>20-m sprint;<br>20-m dribbling;<br>agility tests with and without ball;<br>side-shuffling in a defensive stance;<br>side-shuffling in a defensive stance from a drop jump;<br>zigzag side-shuffling in a defensive stance | 26 basketball players members of the national teams of Slovenia and Serbia, grouped by position; all females | average age: 25.12 ± 3.60 years<br>- guards: n=8<br>- forwards: n=8<br>- centers: n=10                                                                       | There was a difference between individual player types in terms of body height and body weight, and some differences were also established in the tests of acceleration with the ball and without it. After eliminating the influence of body height and body weight, the differences in the speed of acceleration decrease and become statistically insignificant. The strongest influence was still observed in the S20 (the 20-meter sprint) and V20 (20-metre dribbling) tests.                                                                                                                                                                                    | Body height and body weight significantly influence the speed of acceleration, i.e., cyclic speed, even among highly qualified female basketball players at a high international level, whereas the influence of the abovementioned morphological characteristics on the speed of performance of acyclic and agility movement is weaker.                                                                                                                                                                                                                                                                             |
| 26  | Haugen, T.A.; Breitschädel, F.; Seiler S. (2019)                                                                  | 40-m sprint                                                                                                                                                                                                                                   | 298 handball players and 121 basketball players from the highest division level in Norway; all males         | - handball: n=298, age 22 ± 4 years<br>- basketball: n=121, age 22 ± 3 years                                                                                 | Substantial differences in sprint performance and mechanical outputs were also observed among playing positions and playing level                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Identifying the sprinting demands in handball and basketball according to playing level and position is essential for developing appropriate training programs and optimal physical preparedness to competition. The output values within this robust sample may lay the groundwork for developing focused interventions designed to optimize the training stimulus and use the optimal coaching cues for sprint performance enhancements.                                                                                                                                                                           |
| 27  | Stojanovic, E.; Aksovic, N.; Stojiljkovic, N.; Stankovic, R.; Scanlan, A.T.; Milanovic, Z. (2019)                 | Lane Arrow Closeout;<br>Lane Agility Drill;<br>Reactive Shuttle Test;<br>Run-Shuffle-Run;<br>Compass Drill;<br>Modified 505 Test                                                                                                              | 52 elite adolescent players, grouped by position; all males                                                  | age: 17.3 ± 1.0 years                                                                                                                                        | All tests demonstrated acceptable reliability (intraclass correlation coefficient: 0.50–0.88; coefficient of variation: 5.1–7.9%). The principal component factor analysis in all tests resulted in the extraction of one significant component that explained 74% of the total variance across tests. Positional comparisons showed that backcourt (guards) players performed better (small to moderate differences) in all CODS tests compared with frontcourt (forwards and centers) players. All                                                                                                                                                                   | All used tests were deemed reliable and valid in adolescent basketball players. The “Lane Agility Drill” and “Run-Shuffle-Run” tests seem the most appropriate to quantify changes in CODS possessing the lowest TE, whereas the “Lane Arrow Closeout” and “Lane Agility Drill” tests are the most sensitive in detecting positional differences                                                                                                                                                                                                                                                                     |
| 28  | Wierike, S.C.M.t.; Tromp, E.J.Y.; Meerhoff, L.A.; Coelho-e-Silva, M.J.; Elferink-Gemser, M.T.; Visscher, C (2015) | STARtest with and without ball;<br>Slalom Sprint;<br>Dribble Test                                                                                                                                                                             | 52 youth basketball players; mixed sexes                                                                     | - males: n=40, age 16.38 ± 1.48 years<br>- females: n=12, age 15.83 ± 1.47 years                                                                             | Results showed that there were no significant differences between test and retest, neither for the change-of-direction speed (t(51)=0.90, p=0.37), nor for the ball control of players (t(51)=0.76, p=.45).                                                                                                                                                                                                                                                                                                                                                                                                                                                            | This study showed that the STARtest, which has already shown its practical value for coaches and trainers, is a scientifically reproducible and valid test to measure and monitor the change-of-direction speed and ball control of talented, youth basketball players.                                                                                                                                                                                                                                                                                                                                              |
| 29  | Feroli, D.; Rampinini, E.; Bosio, A.; La Torre, A.; Azzolini, M.; Coutts, A.J. (2018)                             | Yo-YoIR1;<br>6-min continuous running test (Mognoni’s test);<br>CMJ;<br>5-min High-intensity Intermittent running test (HIT)                                                                                                                  | 129 basketball players from four Italian divisions, grouped by position; all males                           | - Div I: n=39, age 26.5 ± 5.0 years<br>- Div II: n=28, age 24.1 ± 4.1 years<br>- Div III: n=34, age 24.4 ± 5.8 years<br>- Div IV: n=28, age 21.7 ± 5.3 years | Magnitude-based inferences revealed that differences in HIT were very likely moderate between Division I and II and likely small between Division II and III. The differences in absolute peak power and force produced during CMJs between Division I and II and between Division II and III were possibly small. Differences in Yo-YoIR1 and Mognoni’s test were very likely-to-almost certain moderate/large between Division III and VI. We observed possibly-to-likely small differences in HIT and Mognoni’s test between guards and forwards and almost certainly moderate differences in absolute peak power and force during CMJs between guards and centers. | Strength and conditioning coaches should focus to enhance the ability to sustain intermittent efforts at higher intensities and to improve strength/power characteristics of the athletes, while technical coaches should use basketball- specific exercises to enhance these characteristics (e.g., small side-games). Furthermore, the present findings highlight the anthropometric characteristics that are generally required to compete at high level (i.e., Division I and II) and provide insight into the talent identification and into the determination of the athlete’s playing position in basketball. |

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| 30  | Delextrat, A; Cohen, D. (2009)                                                                           | Vertical jump;<br>Single-leg jump;<br>20-m sprint test;<br>Agility T-test;<br>Suicide run;<br>Basketball chest pass.                                                                                                                                                                                                                            | 30 national level players; all females                                                                                                                                  | - guards: n=10, age 24.6 ± 2.9 years<br>- forwards: n=10, age 26.3 ± 4.0 years<br>- centers: n=10, age 24.8 ± 1.6 years                                                 | As expected, centers were significantly taller and heavier than forwards and guards, and forwards were significantly taller than guards (p < 0.05). No significant effect of playing position was observed on the subjects' age and body fat percentage, although centers had higher body fat levels compared with guards and forwards (p < 0.05). although no significant difference was observed in VJ among the 3 groups, guards achieved a significantly greater jump height in the SLJ compared with forwards (+15.2%) and centers (+21.8%, p < 0.05). In addition, when jumping height was converted to power in VJ, significantly better performances were observed in centers compared to guards (p < 0.05). Results also showed that guards were significantly faster than centers in the agility T-test (+6.4%) and the suicide run (+7.5%); in addition, a significant difference was shown between guards and forwards in the time to complete the suicide run, guards being faster by 7.1% (p < 0.05). In contrast with these results, no significant effect of playing position was observed on the 20-m sprint performance or the basketball chest pass (p < 0.05). | The main results of this study indicated a significant effect of playing position on the anaerobic fitness of women basketball players. The differences were mostly observed between guards and centers, with guards overall jumping higher and developing higher relative strength and power of the lower limb than centers (p < 0.05). These observations could allow coaches and athletes to discriminate which skills are specific to each playing position and should be practiced individually during physical fitness sessions. |
| 31  | Legg, JS. (2017) study 1                                                                                 | 20m sprint test, Yo-Yo intermittent Recovery Level 1 test.<br>Countermovement jump (CMJ), drop jump                                                                                                                                                                                                                                             | 26 Australian female representative basketball players categorized as guards (n=9), forwards (n=5) centres (n=11)                                                       | Age: 24.1 ± 3.6 y; mean ± SD                                                                                                                                            | Cproducing significantly (p>0.05) greater concentric peak force (2641 ± 864 N) than guards (2113 ± 134 N) during the CMJ. This was likely due to the significant differences in mass between centres (78.7 ± 7.2kg) and guards (67.0 ± 6.1kg). There were small but not clinically significant differences between playing position in CMJ variables for concentric peak power (Watts (W)), concentric peak power (W/kg) and concentric mean power (W) with centres scoring higher than forwards and guards. Guards recorded faster times to 5 m (1.16 ± 0.05s), than centres (1.22 ± 0.10s) and forwards (1.17 ± 0.16s) but again these differences were not clinically significant.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Based on the lack of clear physiological and performance differences between the positional groups for these selected variables, it is suggested that these baseline performance markers are required across all positions to be considered for the Australian basketball team. Following                                                                                                                                                                                                                                              |
| 32  | Pehar, M.; Sekulic, D.; Sisic, N.; Spasic, M.; Uljevic, O.; Krolo, A.; Milanovic, Z.; Sattler, T. (2017) | standing broad jump (SBJ);<br>countermovement jump (CMJ);<br>reactive strength index (RSI);<br>repeated reactive strength ability (RRSA);<br>four running vertical jumps: maximal jump with (i) take-off from the dominant leg and (ii) non-dominant leg, lay-up shot jump with take-off from the (iii) dominant leg and (iv) non-dominant leg. | 110 professional-level (1 <sup>st</sup> and 2 <sup>nd</sup> national divisions) basketball players from Bosnia-Herzegovina, grouped by position and division; all males | overall average age 21.58±3.92 years<br><br>by division:<br>- Div 1: n=58<br>- Div 2: n=52<br><br>by position:<br>- guards: n=49<br>- forwards: n=22<br>- centers: n=39 | First-division players were taller (ES: 0.76, 95%CI: 0.35-1.16, moderate differences), heavier (0.69, 0.29-1.10), had higher maximal reach height (0.67, 0.26-1.07, moderate differences), and had lower body fat % (-0.87, -1.27-0.45, moderate differences) than second-division players. The playing positions differed significantly in three of four running jump achievements, RSI and RRSA, with Centers being least successful. The first-division players were superior to second-division players in SBJ (0.63, 0.23-1.03; 0.87, 0.26-1.43; 0.76, 0.11-1.63, all moderate differences, for total sample, Guards, and Forwards, respectively).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Running vertical jumps and repeated jumping capacity can be used as valid measures of position-specific jumping ability in basketball. non-significant differences in measured jumping performances between playing levels.                                                                                                                                                                                                                                                                                                            |
| 33  | Mtsweni, L.B.; West, S.J.; Taliep, M.S. (2017)                                                           | Anthropometry;<br>1-RM bench press;<br>1-RM bilateral incline leg press;<br>two handed chest pass;<br>CMJ;                                                                                                                                                                                                                                      | 55 South African players, grouped by level; all females                                                                                                                 | - national: n=14, age 24.0 ± 3.5years<br>- provincial: n=17, age 21.3 ± 2.7 years<br>- university: n=24, age 22.0 ± 3.6 years                                           | Stature differed significantly across the three groups (F2, 52=7.4; p=0.002). Hamstring flexibility differed significantly across the three groups (F2, 51=6.4; p=0.003). Upper body strength (1-RM bench press test) and lower body muscle strength (1-RM leg press test) did not differ significantly between the three groups. Chest-pass data indicates that the three groups differed significantly (F2, 52=7.0; p=0.002). CMJ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | The physical fitness status of female basketball players in SA needs to improve, which would potentially enhance their playing performance. Appropriate monitoring and managing of the players' physical fitness by implementing or improving the strength and conditioning programmes is recommended. This should be a high priority in the development of female basketball in SA.                                                                                                                                                   |

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|     |                                                                                                            | modified push-up test;<br>Agility T-test;<br>suicide run;<br>20-m sprint test;<br>shuttle run                            |                                                                                                                                                                         |                                                                                                                                                                         | data and muscular endurance (push-ups and sit-ups) indicated that there were no significant differences across the three groups. Twenty-meter-sprint times differed significantly across the groups (F 2, 41=5.8; p=0.006). The provincial-level players (3.5±0.2; 95% CI [3.4, 3.6]) were significantly faster than university- level players (3.8±0.2; 95% CI [3.7, 3.9]; p=0.007). Estimated VO2 max differed significantly across the groups.                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 34  | Fernández-Leo, A.;<br>Gómez-Carmona, C.D.;<br>García-Rubio, J.; Ibáñez, S.J. (2020)                        | External and internal load from six official final-round games                                                           | 11 amateur senior basketball players; all males                                                                                                                         | age 18.82 ± 1.65 years                                                                                                                                                  | (a) guards covered more volume of displacements (effective on-court time: p < 0.01, E2R = 0.05; steps/min: p < 0.01, E2R = 0.28) and the centers performed competitive actions of higher load ([>8G] Imp/min: p < 0.01, E2R = 0.20; jumps/min: p < 0.01, E2R = 0.33);<br><br>(b) a performance decreasing was found between the first and second half of the game; (c) in balanced matches there was the most individual technical performance (PIR/min: p < 0.98, E2R = 0.01), while in the unbalanced games more high-intensity impacts were seen ([>8G] Imp/min: p < 0.01, E2R = 0.07).                                                                                                                                  | Finally, no relationship was found between technical and physical performance. In terms of physical performance variables, a higher effective on-court time had a direct correlation with internal and external workload demands. Therefore, the monitoring and analysis of the physical and technical performance in amateur-level senior basketball will allow for the design of training loads, planning strategies, injury prevention programs and recovery protocols between workouts and matches tailored to this specific level. |
| 35  | Sekulic, D.; Pehar, M.;<br>Krolo, A.; Spasic, M.;<br>Uljevic, O.; Calleja-González, J.; Sattler, T. (2017) | Agility-T test;<br>nonplanned basketball agility test;<br>preplanned (change-of-direction speed) basketball agility test | 110 professional-level (1 <sup>st</sup> and 2 <sup>nd</sup> national divisions) basketball players from Bosnia-Herzegovina, grouped by position and division; all males | overall average age 21.58±3.92 years<br><br>by division:<br>- Div 1: n=58<br>- Div 2: n=52<br><br>by position:<br>- guards: n=49<br>- forwards: n=22<br>- centers: n=39 | The reliability of agility tests was high (intraclass correlation coefficient of 0.81–0.95). Forwards were most successful in the T-TEST (F test: 13.57; p = 0.01). Guards outperformed Centers in BBCODSdom, BBCODSndom, BBAGILdom, and BBAGILnond (F test: 5.06, p = 0.01; 6.57, 0.01; 6.26, 0.01; 3.37, 0.04, respectively). First division Guards achieved better results than second division Guards in BBCODSdom (t: 2.55; p = 0.02; moderate effect size differences), BBAGILdom, and BBAGILnond (t: 3.04 and 3.06, respectively; both p =0.01 and moderate effect size differences). First division Centers outperformed second division Centers in BBAGILdom (t:2.50; p = 0.02; moderate effect size differences). | The developed basketball-specific agility tests are applicable when defining position-specific agility. Both preplanned and nonplanned agilities are important qualities in differentiating between Guards of 2 performance levels. The results confirmed the importance of testing basketball-specific nonplanned agility when evaluating the performance level of Centers.                                                                                                                                                            |
| 36  | Jakovljevic, S.; Karalejic, M.S.; Pajic, Z.B.; Jankovic, N.; Erculj, F (2015)                              | 1RM back squat;<br>20-metre sprint;<br>vertical jump test                                                                | 35 professional basketball players, grouped by position; all males                                                                                                      | - outside: n=22, age 20.90 ± 2.09 years<br>- inside: n=13, age 22.15 ± 3.91 years                                                                                       | None of the variables of strength were significantly related to the speed performance, while moderate correlations occurred between the normalized strength variables (1RM Squat/kg and 1RM SquatAl) and vertical jump (r = 0.310 and r = 0.308 / p < 0.05)                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | It was shown that inside and outside players are not significantly different in back squat, sprint variables and vertical jumps. There were significant differences in in the variable of peak anaerobic power (PAPW) in favour of inside players. The higher value of peak anaerobic power that the inside players have shown their greater potential to perform mechanical work.                                                                                                                                                      |

| Ref | Author and date                                                                                                  | Applied physical tests                                                                                                                                                                                           | Groups of participants                                                                        | Age and size of groups                                                                                                                                                               | Results of the testing                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Study conclusions                                                                                                                                                                                                                                                                                                                                                                                          |
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| 37  | Delextrat, A.; Cohen, D. (2008)                                                                                  | vertical jump;<br>20-m sprint;<br>agility T test;<br>suicide run;<br>30- second Wingate anaerobic test;<br>isokinetic testing of the knee extensors;<br>1RM bench press                                          | 16 players grouped by level; all males                                                        | - elite: n=8, age 25.4 ± 2.4 years<br>- average: n=8, age 21.9± 2.1 years                                                                                                            | Compared to average-level players, elite-level players achieved significantly better performances in the agility T test (+6.2%), VJ test (+8.8%), peak torques developed by knee extensors (+20.2%), and 1RM bench press (+18.6%, p < 0.05). In contrast, no significant difference between groups was observed on 20-m sprint, suicide run, and parameters of the WAnT (p < 0.05).                                                                                                                                                                                                                                                                               | The study highlights the importance of anaerobic power in modern basketball, whereas anaerobic capacity does not seem to be a key aspect to consider. In this context, coaches are advised to avoid using exercises lasting 30+ seconds in their physical fitness programs, but instead to focus on short and intense tests such as VJ, agility T test, and sprints over very short distances (5 or 10 m). |
| 39  | Ramos, S.; Volossovitch, A.; Ferreira, A.P.; Fragoso, I.; Massuça, L. (2019)                                     | Anthropometry and X-ray;<br>line drill test;<br>Yo-Yo intermittent recovery test;<br>20-m sprint;<br>T-Test;<br>Squat jump;<br>CMJ;<br>2-kg medicine ball throw;<br>Handgrip strength;<br>60-seconds sit-up test | 116 Portuguese basketball players of an elite basketball academy, grouped by level; all males | age range: 12-15                                                                                                                                                                     | Team A players are older, more mature, bigger in size and have greater fitness profiles than the team B players;<br>(ii) stature and abdominal resistance correctly distinguished the best players from others in both categories: U-14 and U-16;<br>(iii) aerobic capacity discriminates youth basketball players according to their level in U-14, and agility in U-16 category;<br>(iv) biological maturation (SA) had an effect on the reported discriminant attributes in the stature of U-14 category.                                                                                                                                                      | Coaches are recommended to avoid premature talent identification and provide players with opportunities to progress through the talent pathway, at least until U-16 age category. Focus on talent development programs instead of early talent identification and selection, which are based on biological determinants and genetic factors.                                                               |
| 40  | Torres-Unda, J.; Zarrazquin, I.; Gil, J.; Ruiz, F.; Irazusta, A.; Kortajarena, M.; Seco, J.; Irazusta, J. (2013) | 1km running;<br>20-m sprint test; dribbling<br>17.9-m slalom;<br>CMJ                                                                                                                                             | 62 young players grouped by level; all males                                                  | - elite: n=16, age: 13.78 ± 0.67 years<br>- non-elite: n=46, age: 13.60 ± 0.26 years                                                                                                 | Anthropometric analysis indicated that elite players were taller, heavier and had a higher percentage of muscle. Further, physiological testing showed that these elite players perform better in jump, endurance, speed and agility tests (especially in the agility and ball tests). In addition, these skills are correlated with point average during the regular season. More basketball players born in the first semester of the year are selected and there is a predominance of early-maturing boys among those selected for the elite team. Those who are more mature have advantages in anthropometric characteristics and physiological test results. | Around puberty, physical and physiological parameters associated with maturity and CA are important in determining the success of basketball players. These findings should be taken into account by trainers and coaches, to avoid artificial bias in their selection choices.                                                                                                                            |
| 42  | Ferioli, D.; Rampinini, E.; Bosio, A.; La Torre, A.; Maffiuletti, N.A. (2019)                                    | standardized multi-stage COD exercise                                                                                                                                                                            | 111 players from 4 different divisions; all males                                             | - Division I: n=27, age: 25.3 ± 5.2 years<br>- Division II: n=25, age: 24.5 ± 3.9 years<br>- Division III: n=32, age: 24.1 ± 5.7 years<br>- Division VI: n=27, age: 21.6 ± 5.3 years | In study 1, we found possibly small differences (ES±90%CI: -0.24±0.39) in fatigue between division I and II. Division I was characterized by likely (ES: 0.30 to 0.65) and very likely-to-almost certain (ES: 0.74 to 1.41) better PTmax and fatigue levels compared to division III and VI, respectively. In study 2, fatigue was very likely reduced (ES: -0.91 to -0.51) among all divisions from T1 to T2, while PTmax was likely-to-very likely reduced (ES: -0.51 to -0.39) in division II and III.                                                                                                                                                         | Professional basketball players are characterized by a better peripheral muscle function during a MCODE. Most of the seasonal changes in peripheral muscle function occurred after the preparation period. These findings inform practitioners on the development of training programs to enhance the ability to sustain repeated changes of direction efforts.                                            |

| Ref | Author and date                                                                       | Applied physical tests                                                                                                                                                                                                           | Groups of participants                                                                  | Age and size of groups                                                                | Results of the testing                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Study conclusions                                                                                                                                                                                                                                                                                                                                                                                                                                            |
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| 43  | Aksovic, N.; Kocic, M.; Beric, D. (2020)                                              | various (this is a review)                                                                                                                                                                                                       | 63 papers                                                                               | -                                                                                     | In spite of the inborn coefficient, the development of explosive power can be realized through planned, rational and well- organized training. A positive correlation was determined between explosive power and running at short distances, jumps and throwing, as well as between explosive power and lean body mass in basketball players of different ages.                                                                                                                                                                      | Explosive power is a significant characteristic of professional basketball players and one of the most important factors for achieving top results. It is necessary to give greater attention to the training of explosive power, because it is an effective means that contributes to the efficiency of the basketball player.                                                                                                                              |
| 44  | Arede, J.; Ferreira, A.P.; Gonzalo-Skok, O.; Leite, N. (2018)                         | CMJ;<br>Squat jump;<br>Abalakov Jumps (ABA);<br>2-kg medicine ball throw;<br>20- m sprint;<br>Yo-YoIR1;<br>Agility T-test;<br>Sit and Reach Test (SR);<br>lower limb asymmetry index (ASI);<br>Game-related statistics.          | 34 basketball players from the Portuguese U15 national team; all males                  | age: 14.60 ± 0.23 years                                                               | The post-pubertal group showed a significantly better performance in power outputs (jumping and sprinting), throwing abilities and blocks, while pre-pubertal performed significantly better in aerobic fitness and assists. Receiver Operating Characteristic (ROC) curve confirmed maturational status (AUC = 80.4%; p<.05) and training experience (AUC = 78.9%; p<.05) as the most important attributes in predicting U-16 national team                                                                                         | In summary, biological maturation and development lead to the between-subject differences in physical parameters (e.g., SMBT and Yo-Yo IR1), technical parameters (e.g., assists, blocks, assist/TO ratio; steal/ TO ratio and assist ratio) and selection of elite youth basketball players in the national team.                                                                                                                                           |
| 45  | Lockie, R.G.; Jeffriess, M.D.; McGann, T.S.; Callaghan, S.J.; Schultz, A.B. (2014)    | 10-m Sprint;<br>Y-Shaped Agility Test                                                                                                                                                                                            | 20 basketball players, grouped by level; all males                                      | - semi-pro: n=10, age: 21.40 ± 3.13 years<br>- amateur: n=10, age: 23.20 ± 4.66 years | The reactive tests differentiated between the groups; semiprofessional players were 6% faster for the reactive left (P = .036) and right (P = .029) cuts. The strongest correlations were between the 10-m sprints and planned-agility tests (r = .590–.860). The reactive left cut did not correlate with the planned tests. The reactive right cut moderately correlated with the 10-m sprint and planned right cut (r = .487–.485).                                                                                               | Reactive agility discriminated between the semiprofessional and amateur groups; linear speed and planned agility did not. To thoroughly distinguish agility performance between basketball players of differing ability levels, there must be the inclusion of some type of perceptual and decision-making component. This can include stimuli that may not be considered sport-specific (an illuminated timing gate) but are still practically appropriate. |
| 47  | Garcia-Gil, M.; Torres-Unda, J.; Esain, I.; Duñabeitia, I.; Gil, S.M.; Gil, J. (2018) | Anthropometry;<br>2 maximal 20-m sprint;<br>CMJ-S;<br>Agility T-test;<br>Dribbling test;<br>Game performance (PIR)                                                                                                               | 41 basketball players from the first division of the Spanish women’s league; all female | age range 18-32 years                                                                 | The time in the T-Drill test was negatively correlated (P<0.05) with the PIR per min. In contrast, the time in the dribbling test correlated positively (P<0.05) with the number of rebounds and rebounds per minutes. There were no significant correlations between other fitness tests and basketball performance-related results.                                                                                                                                                                                                | Basketball teams could use our model of linear regression to predict the performance index (PIR/min) to select players with greater potential for better game performance values. In addition, since size of upper arm muscles, time in agility tests, and the quantity of subcutaneous fat are modifiable factors, trainers should be aware of the importance of these parameters in basketball.                                                            |
| 48  | Fort-Vanmeerhaeghe, A.; Montalvo, A.; Latinjak, A.; Unnithan, V. (2016)               | Yo-YoIR1;<br>game performance;<br>3/4 court sprint test;<br>T-test;<br>Squat jump;<br>CMJ;<br>Abalakov jumps (ABK);<br>medicine ball throw 3kg;<br>line-drill test;<br>10 x 30-m shuttle run sprints;<br>1RM leg press exercises | 23 elite adolescent Spanish basketball players, grouped by age; all females             | - U16: n=9, age: 15.30 ± 0.50 years<br>- U18: n=11, age: 17.00 ± 1.10 years           | anthropometric and physical performance variables were compared between groups, the U18 group demonstrated significantly (p<0.05) higher values in upper (+21.2%) and lower (+27.11%) limb strength compared to the U16 group. Furthermore, no significant differences between groups were observed in match performance outcomes. Only two performance variables, steals and assists per game, correlated significantly with jump capacity, speed, agility, anaerobic power, repeated sprint ability and aerobic power (p ≤ 0.005). | The results demonstrated age group differences for strength characteristics only. The results suggest that superior aerobic and anaerobic power, speed, agility and jump capacity are related to some key game-related performance measures.                                                                                                                                                                                                                 |



| Ref | Author and date                                                                            | Applied physical tests                                                                                                                                                                                                               | Groups of participants                                                                                   | Age and size of groups                                                               | Results of the testing                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Study conclusions                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
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| 49  | Ben Abdelkrim, N.; Castagna, C.; Jabri, I.; Battikh, T.; El Fazaa, S.; El Ati, J. (2010)   | game performance; quintuple horizontal jump test; Agility T-test; 10-m, 20-m, 30-m sprints; 1RM Squat; 1RM Relative squat; 1RM Bench press; Relative bench press; Shuttle-run test peak; Estimated V <sub>̇</sub> O <sub>2</sub> max | 18 Tunisian elite junior basketball players; all males                                                   | age 18.2 ± 0.5 years                                                                 | During the games, players covered 7,558 ± 575 m, of which 1,743 ± 317; 1,619 ± 280; and 2,477 ± 339 m were performed at high, moderate, and low intensities, respectively. The 19.3 ± 3.5 and 56.0 ± 6.3% of the playing time was spent above 95% and at 85–95% of maximal HR, respectively. Average and mean peak [BL] were 5.75 ± 1.25 and 6.22 ± 1.34 mmol/L; respectively. Distances covered at maximal- and high-speed running significantly (p < 0.01) decreased during the second half. Game maximal- and high-speed running were significantly correlated with endurance performance (r = 0.52, p < 0.05 and r = 0.49, p < 0.05, respectively). High intensity shuffling distance resulted in being negatively related with agility (r = 20.68, p < 0.05).                                             | Professionals should consider in their basketball-specific testing batteries agility and aerobic fitness to test and to check players’ preparedness to cope with game demands, together with strength and explosive-power ability performance assessment.                                                                                                                                                                                                                       |
| 50  | Dawes, J.; Marshall, M.; Spiteri, T (2016)                                                 | Vertical jump; lane agility test; 5-m and 20-m sprint; NBA line drill; 20-m multi-stage fitness test                                                                                                                                 | 10 NCAA Division II basketball players; all males                                                        | not available                                                                        | Pearson’s product moment correlations revealed significant correlations were observed between playing time and predicted 1-RM bench press (r ≥ 0.71) and 1-RM back squat (r ≥ 0.74).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Coaches should emphasize the importance of resistance training to develop upper and lower body strength to increase playing time in Division II collegiate athletes.                                                                                                                                                                                                                                                                                                            |
| 51  | Ramos, S.; Volossovitch, A.; Ferreira, A.P.; Barrigas, C.; Fragoso, I.; Massuça, L. (2020) | 20-m sprint; Agility T-test; CMJ; medicine ball throw 2kg; Handgrip Strength; Sit and Reach Test                                                                                                                                     | 192 adolescent U14 basketball players from First Portuguese division, grouped level and sex; mixed sexes | - males: n=90, age: 13.80 ± 0.33 years,<br>- females: n=102, age: 13.48 ± 0.59 years | In both sexes, no significant differences were found for maturity. Anthropometric and physiological analysis indicated that male players from finalist’s teams were significantly faster, were more agile, threw the medicine ball longer, and showed lower percentages of body fat than players from lower-ranked teams. Further, semi- finalists were faster than lower-ranked players. In the same sense, female players from semifinalist teams demonstrated to be significantly faster, more agile, and threw the medicine ball longer than female players from lower-ranked teams. In addition, discriminant analysis showed that speed (in boys) and the combination of speed and upper limb strength (in girls) could successfully discriminate players with different performances in a championship. | At this practice level, coaches should combine the sport-specific basketball drills with the speed and agility purposes. Considering that the U-14 level is a primary stage of any basketball training program, it is desirable that players should be encouraged to run over the frequent defensive-offensive transitions, to produce efficient fast-break shots, and to play with intensive and pressure behaviors over the ball handlers in the defensive phase of the game. |
| 52  | Manuel Clemente, F.; Conte, D.; Sanches, R.; Moleiro, C.F.; Gomes, M.; Lima, R. 2019       | Yo-Yo Intermittent Recovery Test–level 1 countermovement jump performance<br><br>technical action (attacking balls, shots, received balls, rebounds, conquered balls, lost balls) during Small-side games                            | 20 male basketball players                                                                               | Under 14<br>Under 16                                                                 | The results of this study revealed that both anthropometry and fitness variables are associated with technical performance during SSGs. However, correlations are not clear with the levels of perceived exertion reported by player                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Coaches should be aware of such relationships to better design their Small Side Games format and implement basketball drills based on the specific players’ characteristics.                                                                                                                                                                                                                                                                                                    |

| Ref | Author and date                                                                | Applied physical tests                                                                                                                                                                                                             | Groups of participants                                              | Age and size of groups                                                                                                                                                            | Results of the testing                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Study conclusions                                                                                                                                                                                                                                                                                                                 |
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| 53  | Guimarães, E.; Ramos, A.; Janeira, M.A.; Baxter-Jones, A.D.G.; Maia, J. (2019) | Yo-Yo Intermittent Endurance Test, Level 2; Sit-up test; Handgrip strength; Squat jump; CMJ; 3 kg seated medicine ball throw; 20-m sprint; Agility T-test; speed shot shooting; passing; control dribble; defensive movement drill | 150 adolescent basketball players, grouped by maturation; all males | average age 13.3 ± 0.7 years<br>- early maturers: n=30, age: 13.5 ± 0.5 years,<br>- average maturers: n=84, age: 13.2 ± 0.7 years<br>- late maturers: n=36, age: 13.3 ± 0.7 years | Results indicated that early maturers were taller, heavier, and had greater strength, power, speed, and agility (p < 0.05). When controlling for age, height, and body mass, early maturers remained stronger, quicker, and more agile (p < 0.05). They were also more skillful in the speed shot shooting test (p < 0.05). Apart from tests of aerobic fitness, abdominal muscular strength and endurance, and lower body explosive power, maturity status was the primary contributor to the variance in the physical performance tests. Years of training was the primary contributor to the variance in the technical skills tests. Whilst physical performance was dependent on maturity status, technical skills were influenced by years of training. | The findings of the present study highlight the importance of maturity status’ influence on young basketballers’ physical performance and technical skills development. In general, our results indicated that physical performance is dependent on maturity status, whilst technical skills are influenced by years of training. |