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Total Immersion Session:

Court Sports Series

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Images: deviantart.com, espn.com, catapultsports.com

Court sports included in this presentation are; basketball and netball.

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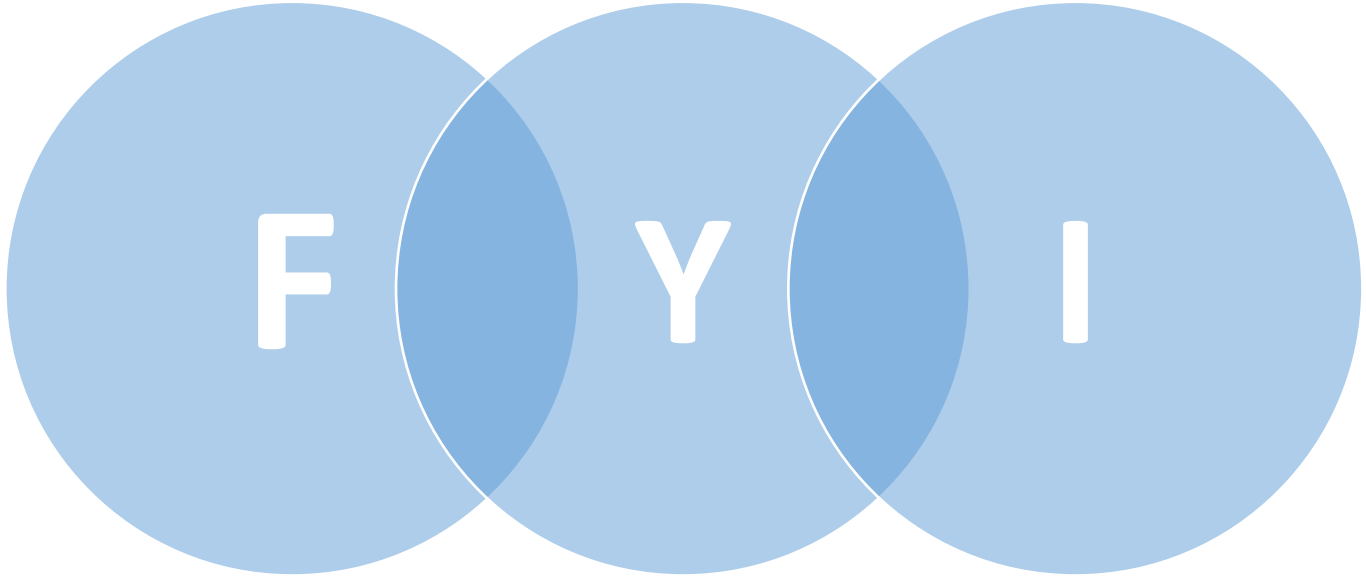


In 2019, basketball was reported to have 280,900 and netball 319,400 active participants in each sport. Basketball reported a drop in people participants taking part in their sport compared to previous years. However, netball showed an increase of 50,200 from the previous year ***(Sport England, Active Lives 2019)***

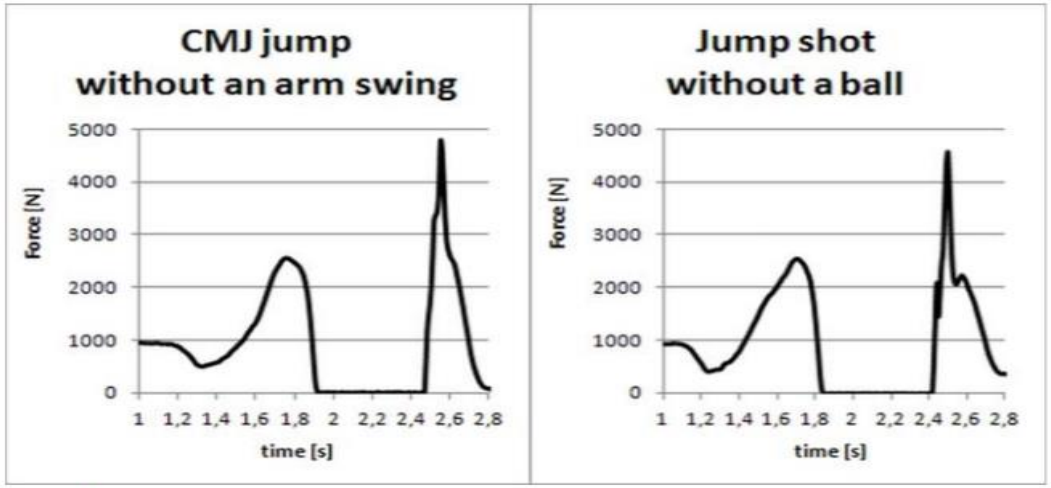
What type of athlete do we need to develop?

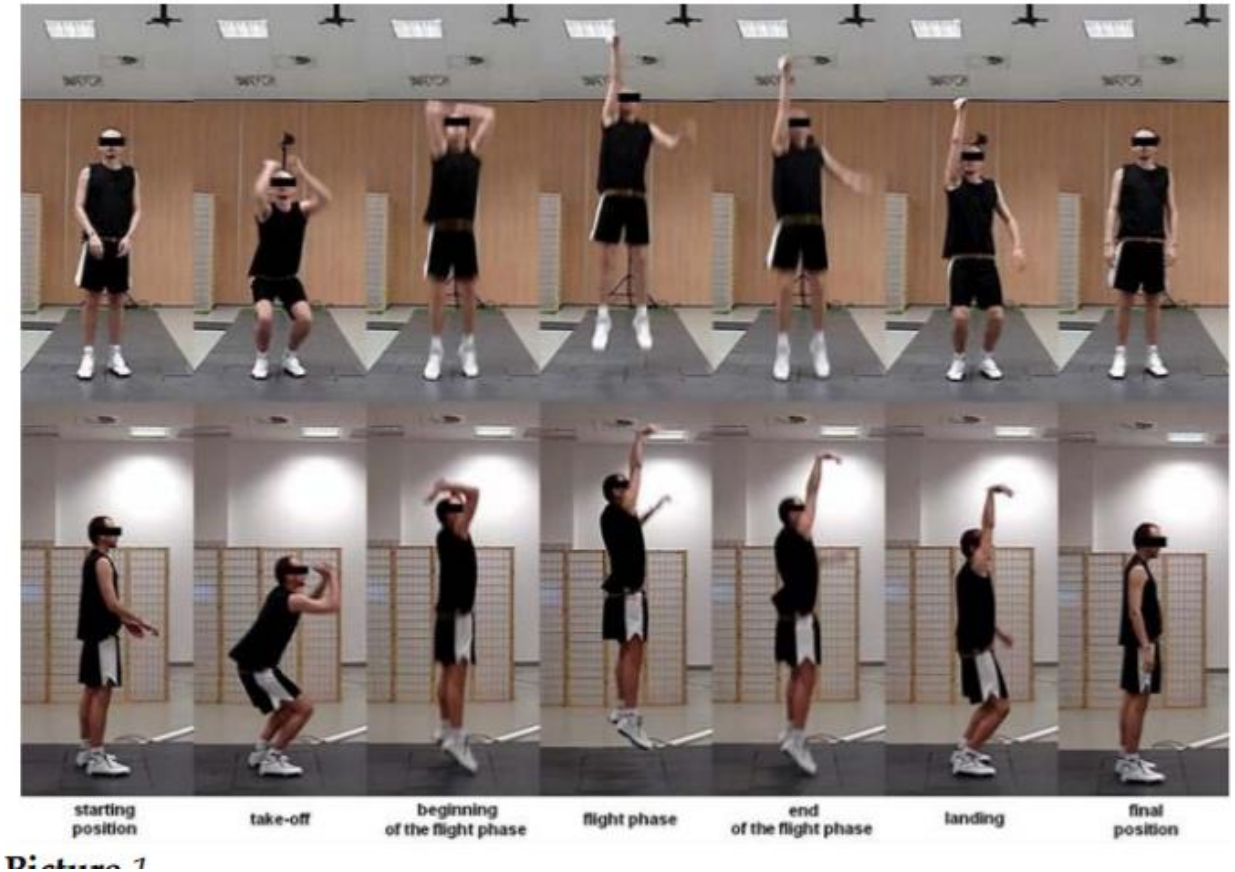
Basketball Analysis:

Table 4 Frequency and duration of different activities during the matches

Activity	All players	Guard (n = 6)	Forward (n = 6)	Centre (n = 6)
Frequency (n)				
Sprint	55 (11)	67 (5)*†	56 (5)‡	43 (4)
High-specific movement	94 (16)	104 (19)	94 (13)	85 (8)
Jump	44 (7)	41 (7)	41 (6)	49 (3)
Total high intensity	193 (24)	211 (24)§	190 (22)	177 (10)
Run	97 (14)	103 (11)	88 (5)	101 (19)
Medium-specific movement	197 (33)	230 (37)*‡	186 (13)	176 (9)
Total moderate intensity	294 (40)	332 (44)*§	274 (12)	277 (25)
Jog	113 (8)	113 (8)	110 (10)	117 (6)
Low-specific movement	175 (10)	176 (14)	173 (6)	175 (11)
Total low intensity	288 (11)	289 (11)	283 (10)	292 (13)
Walk	129 (10)	130 (8)	126 (15)	130 (8)
Stand	147 (11)	141 (15)	149 (9)	150 (10)
Total recovery	275 (16)	271 (18)	275 (23)	280 (3)
Total of all movements	1050 (51)	1103 (32)¶‡	1022 (45)	1026 (27)
Average time (s)				
Sprint	2.1 (0.2)	1.9 (0.2)	2.1 (0.1)	2.2 (0.1)
High-specific movement	2.0 (0.2)	1.9 (0.3)	2.1 (0.2)	2.0 (0.2)
Jump	1.0 (0.1)	0.9 (0.1)	1.0 (0.1)	1.1 (0.1)
Total high intensity	1.8 (0.1)	1.7 (0.2)	1.8 (0.1)	1.8 (0.1)
Run	2.3 (0.3)	2.1 (0.4)	2.4 (0.2)	2.4 (0.4)
Medium-specific movement	1.9 (0.2)	1.8 (0.1)	2.0 (0.2)	1.9 (0.1)
Total moderate intensity	2.1 (0.2)	1.9 (0.2)	2.2 (0.2)	2.1 (0.1)
Jog	2.2 (0.2)	2.1 (0.1)	2.2 (0.2)	2.3 (0.1)
Low-specific movement	1.7 (0.1)	1.6 (0.1)	1.7 (0.1)	1.8 (0.1)
Total low intensity	1.9 (0.1)	1.8 (0.1)	1.9 (0.1)	2.0 (0.1)
Walk	2.4 (0.3)	2.3 (0.2)	2.4 (0.3)	2.6 (0.1)
Stand	2.3 (0.2)	2.2 (0.3)	2.2 (0.2)	2.4 (0.2)
Total recovery	2.3 (0.2)	2.2 (0.2)	2.3 (0.2)	2.5 (0.1)
Live time (%)				
Sprint	5.3 (0.8)	5.9 (0.7)‡	5.4 (0.3)§	4.5 (0.4)
High-specific movement	8.8 (1)	9.3 (0.9)†	9.2 (0.6)§	7.9 (0.8)
Jump	2.1 (0.3)	2.0 (0.4)	2.0 (0.3)	2.3 (0.1)
Total high intensity	16.1 (1.4)	17.1 (1.2)‡	16.6 (0.8)§	14.7 (1.0)
Run	10.4 (0.8)	10.2 (1.0)	10.1 (0.4)	10.8 (0.9)
Medium-specific movement	17.7 (2.5)	19.8 (2.3)‡	17.9 (2.0)	15.5 (0.9)
Total moderate intensity	28.1 (2.3)	30.0 (1.8)‡	28.0 (2.1)	26.3 (1.5)
Jog	11.6 (0.8)	11.0 (0.5)‡	11.4 (0.7)§	12.4 (0.6)
Low-specific movement	14.2 (1.0)	13.4 (1.1)‡	14.4 (0.6)	14.7 (1.0)
Total low intensity	25.8 (1.5)	24.5 (1.1)‡	25.8 (1.0)	27.2 (1.1)
Walk	14.4 (1.1)	13.9 (1.0)†	14.0 (0.8)	15.4 (0.8)
Stand	15.5 (1.2)	14.5 (1.2)†	15.6 (0.6)	16.4 (1.1)
Total recovery	29.9 (2)	28.4 (1.9)‡	29.6 (1.4)§	31.8 (0.8)

Ben Abdelkrim, N., El Fazaa, S., El Ati, J. and Tabka, Z., 2007. Time-motion analysis and physiological data of elite under-19-year-old basketball players during competition * Commentary. *British Journal of Sports Medicine*, 41(2), pp.69-75.





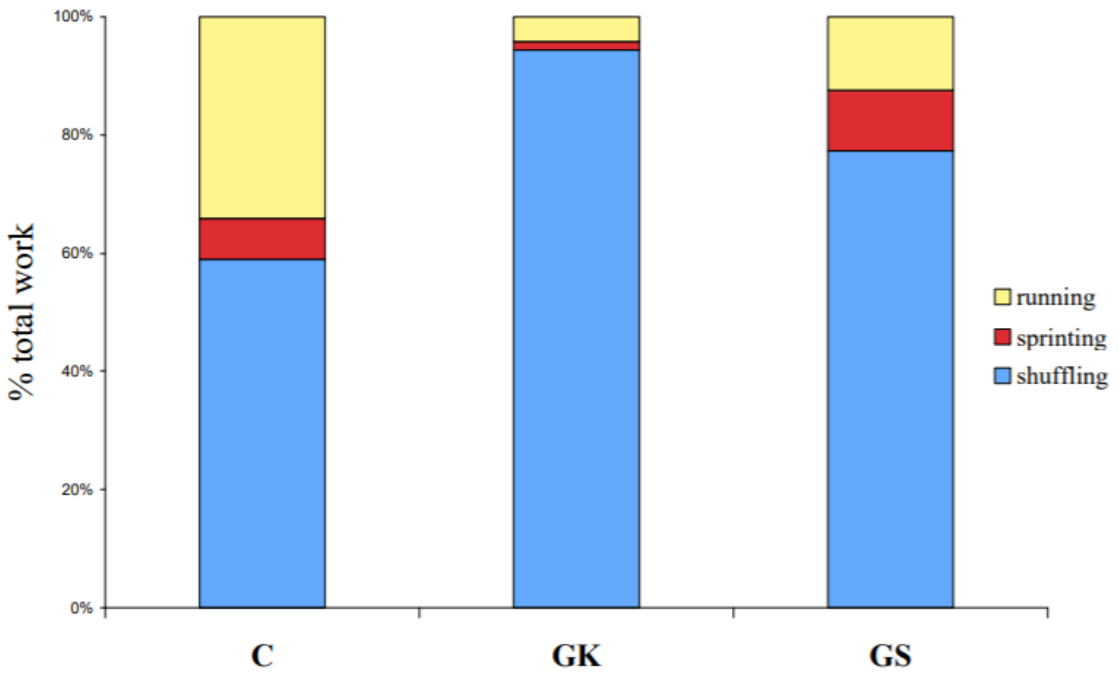
Picture 1

Struzik, A., Pietraszewski, B. and Zawadzki, J., 2014. Biomechanical Analysis of the Jump Shot in Basketball. *Journal of Human Kinetics*, 42(1), pp.73-79.

Netball Analysis

Activity	Centre	Goal Keeper	Goal Shooter
Distance (m)			
Walking	1877 ± 88	1839 ± 64	1706 ± 267
Jogging	1756 ± 308$^{\#\phi}$	195 ± 71*	283 ± 160*
Shuffling	2025 ± 282$^{\#}$	2037 ± 233$^{\#}$	1430 ± 272$^{*\phi}$
Running	1758 ± 494$^{\#\phi}$	143 ± 37*	362 ± 169*
Sprinting	555 ± 274$^{\phi}$	69 ± 54$^{*\#}$	370 ± 233$^{\phi}$
Total	7984 ± 767$^{\#\phi}$	4283 ± 261*	4210 ± 477*
Relative time (%)			
Standing	12.3 ± 1.8$^{\#\phi}$	35.3 ± 2.8$^{*\#}$	44.8 ± 2.4$^{\phi*}$
Walking	31.8 ± 2.4$^{\phi}$	38.7 ± 0.5$^{\#*}$	31.1 ± 1.2
Jogging	17.2 ± 2.5$^{\#\phi}$	1.7 ± 0.7*	2.5 ± 0.9*
Shuffling	20.3 ± 2.8	23.3 ± 2.4$^{\#}$	14.8 ± 2.2$^{\phi}$
Running	14.7 ± 2.3$^{\#\phi}$	0.9 ± 0.3*	2.0 ± 0.8*
Sprinting	2.4 ± 1.2$^{\phi}$	0.3 ± 0.5$^{*\#}$	2.2 ± 0.9$^{\phi}$

*Significant difference from centre ($p < 0.05$) $^{\#}$Significant difference from goal shooter ($p < 0.05$)
$^{\phi}$Significant difference from goal keeper ($p < 0.05$)



Davidson, A. and Trewartha, G., 2008. Understanding the Physiological Demands of Netball: a time-motion investigation. *International Journal of Performance Analysis in Sport*, 8(3), pp.1-17.

Netball Analysis

Table 3. Mean Duration of movement activities (seconds; mean ± s).

Activity	Centre	Goal Keeper	Goal Shooter
Standing	$2.4 \pm 0.4^{\#\phi}$	$5.6 \pm 1.4^{*}$	$6.8 \pm 2.0^{*}$
Walking	$4.0 \pm 0.4^{\phi}$	$5.4 \pm 0.6^{*\#}$	$4.5 \pm 0.5^{\phi}$
Jogging	$2.4 \pm 0.3^{\#\phi}$	$1.7 \pm 0.2^{*}$	$1.7 \pm 0.2^{*}$
Shuffling	$2.8 \pm 0.5^{\phi}$	$5.5 \pm 0.3^{*\#}$	$2.8 \pm 0.4^{\phi}$
Running	$2.0 \pm 0.3^{\#\phi}$	$1.4 \pm 0.2^{*}$	$1.6 \pm 0.2^{*}$
Sprinting	$1.6 \pm 0.3^{\phi}$	$1.0 \pm 0.4^{*\#}$	$1.5 \pm 0.3^{\phi}$

*Significant difference from centre (P< 0.05) #Significant difference from goal shooter (P< 0.05) ϕ Significant difference from goal keeper (P< 0.05)

Table 4. Mean work to rest ratios and total work for the three positional groups (mean ± s).

Positional Group	Mean W:R (1:x)	Total Work (min)
C	$1.9 \pm 0.4^{\#\phi}$	$19.70 \pm 3.97^{\#\phi}$
GK	$3.0 \pm 0.4^{\#*}$	$15.13 \pm 1.57^{\#*}$
GS	$4.6 \pm 0.8^{\phi*}$	$10.80 \pm 1.72^{\phi*}$

*Significant difference from centre (P< 0.05) #Significant difference from goal shooter (P< 0.05) ϕ Significant difference from goal keeper (P< 0.05).

Image: guardian.com

Davidson, A. and Trewartha, G., 2008. Understanding the Physiological Demands of Netball: a time-motion investigation. *International Journal of Performance Analysis in Sport*, 8(3), pp.1-17.

Reliability Variable	U15 ($n=15$)			U17 ($n=17$)			U19 ($n=18$)		
	ICC (90% CI)	TE (90% CI)	CV% (90% CI)	ICC (90% CI)	TE (90% CI)	CV% (90% CI)	ICC (90% CI)	TE (90% CI)	CV% (90% CI)
Single Hop L (m)	0.90 (0.80-0.96)	0.06 (0.05-0.08)	3.9 (3.2-5.4)	0.82 (0.66-0.91)	0.06 (0.05-0.08)	3.4 (2.8-4.5)	0.83 (0.68-0.92)	0.05 (0.04-0.06)	2.7 (2.2-3.5)
Single Hop R (m)	0.91 (0.81-0.96)	0.06 (0.05-0.08)	3.7 (3.0-4.5)	0.91 (0.82-0.96)	0.05 (0.04-0.06)	3.0 (2.5-4.1)	0.90 (0.80-0.95)	0.05 (0.04-0.06)	2.5 (2.1-3.3)
Triple Hop L (m)	0.94 (0.88-0.98)	0.15 (0.13-0.21)	3.2 (2.6-4.4)	0.86 (0.73-0.93)	0.15 (0.13-0.20)	2.8 (2.4-3.8)	0.87 (0.76-0.94)	0.15 (0.13-0.20)	2.2 (2.2-3.5)
Triple Hop R (m)	0.89 (0.78-0.95)	0.13 (0.11-0.18)	2.6 (2.1-3.5)	0.89 (0.78-0.95)	0.13 (0.11-0.18)	2.4 (2.0-3.2)	0.95 (0.90-0.98)	0.10 (0.08-0.13)	1.8 (1.5-2.4)
SJ (m)	0.92 (0.83-0.97)	0.01 (0.01-0.02)	4.1 (3.3-5.6)	0.89 (0.79-0.95)	0.01 (0.01-0.02)	2.7 (2.3-3.7)	0.96 (0.92-0.98)	0.01 (0.01-0.02)	2.9 (2.4-3.9)
CMJ (m)	0.97 (0.93-0.99)	0.01 (0.01-0.01)	2.1 (1.7-2.9)	0.84 (0.70-0.93)	0.02 (0.01-0.02)	3.6 (2.9-4.8)	0.95 (0.91-0.98)	0.01 (0.01-0.02)	2.8 (2.3-3.7)
5 m (s)	0.71 (0.48-0.86)	0.04 (0.02-0.04)	2.3 (1.9-3.2)	0.74 (0.54-0.87)	0.04 (0.03-0.05)	3.1 (2.6-4.2)	0.79 (0.63-0.90)	0.03 (0.03-0.04)	2.9 (2.4-3.8)
10 m (s)	0.80 (0.61-0.91)	0.04 (0.03-0.06)	2.0 (1.7-2.8)	0.80 (0.63-0.90)	0.04 (0.03-0.05)	1.8 (1.5-2.4)	0.76 (0.57-0.88)	0.04 (0.04-0.06)	2.2 (1.9-2.9)
505 L (s)	0.69 (0.44-0.85)	0.05 (0.04-0.07)	1.9 (1.6-2.6)	0.56 (0.29-0.77)	0.09 (0.08-0.13)	3.6 (3.0-4.8)	0.64 (0.41-0.81)	0.07 (0.06-0.09)	2.6 (2.2-3.4)
505 R (s)	0.64 (0.38-0.83)	0.09 (0.07-0.12)	3.3 (2.7-4.6)	0.68 (0.45-0.84)	0.06 (0.05-0.08)	2.3 (1.9-3.1)	0.73 (0.53-0.87)	0.04 (0.03-0.05)	1.6 (1.3-2.1)

*ICC = intraclass correlation coefficient; TE = typical error; CV = coefficient of variation; CI = confidence interval; CMJ = countermovement jump; L = left leg; R = right leg; SJ = squat jump.

Thomas, C., Thomas Ismail, K., Comfort, P., A. Jones, P. and Dos'Santos, T., 2016. Physical Profiles of Regional Academy Netball Players. *Journal of Trainology*, 5(2), pp.30-37.

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Images: abc.com, pexels, getty images

Common Injuries in Basketball

	Overall		Acute			Overuse	
Anatomic localisation	**Injuries (n)**	**Injury incidence (n/1,000h)**	**Injuries (n)**	**Injury incidence (n/1,000h)**	**Absence (weeks &days)**	**Injuries (n)**	**Injury incidence (n/1,000h)**
Ankle	34	1.5 (1.0 – 2.0)	34	1.5 (1.0 – 2.0)	2w 5d (3w 0d)	-	-
Knee	52	2.3 (1.6 – 3.9)	18	0.8 (0.4 – 1.1)	7w 2d (9w 1d)	34	1.5 (1.0 – 2.0)
Other LE [1]	42	1.8 (1.3 - 2.4)	19	0.8 (0.4 – 1.2)	3w 4d (7w 2d)	23	1.0 (0.6 – 1.4)
Fingers	22	0.9 (0.6 – 1.4)	22	0.9 (0.6 – 1.4)	0w 6d (1w 3d)	-	-
Other UE [2]	15	0.7 (0.3 – 1.0)	11	0.5 (0.2 – 0.8)	2w 1d (2w 5d)	4	0.1 (0.0 – 0.3)
Head & Face	18	0.8 (0.4 – 1.1)	18	0.8 (0.4 – 1.1)	0w 5d (0w 6d)	-	-
Back	28	1.3 (0.8 – 1.7)	14	0.6 (0.3 – 0.9)	1w 6d (1w 0d)	14	0.6 (0.3 – 0.9)
Other/unknown	15	0.7 (0.3 – 1.0)	3	0.1 (-0.0 – 0.3)	0w 4d (0w 0d)	12	0.5 (0.2 - 0.8)
Total	226	9.8 (8.5 – 11.1)	139	6.0 (5.0 – 7.0)	2w 5d (5w 1d)	87	3.8 (3.0 – 4.6)

Movements involved in the occurrence of ankle sprains.

Ankle sprains	**Contact**	**Non-contact**	**Total**
Jumping tasks [1]	44.1 %	8.8 %	52.9 % *†‡
Cutting	5.9 %	5.9 %	11.8 % *
Running to score [1]	11.8 %	0.0 %	11.8 % †
Passing & Receiving	2.9 %	2.9 %	5.9 % §
Unknown	2.9 %	14.7 %	17.6 %
Total	67.6 % #	32.4 % #	100%
Other acute injuries	69.7% §	30.3% §	100%

Cumps, E., 2007. Prospective Epidemiological Study of Basketball Injuries During One Competitive Season: Ankle Sprains and Overuse Knee Injuries. *Journal of Sports Science and Medicine*, (6), pp.204-2011.

Common Injuries in Basketball

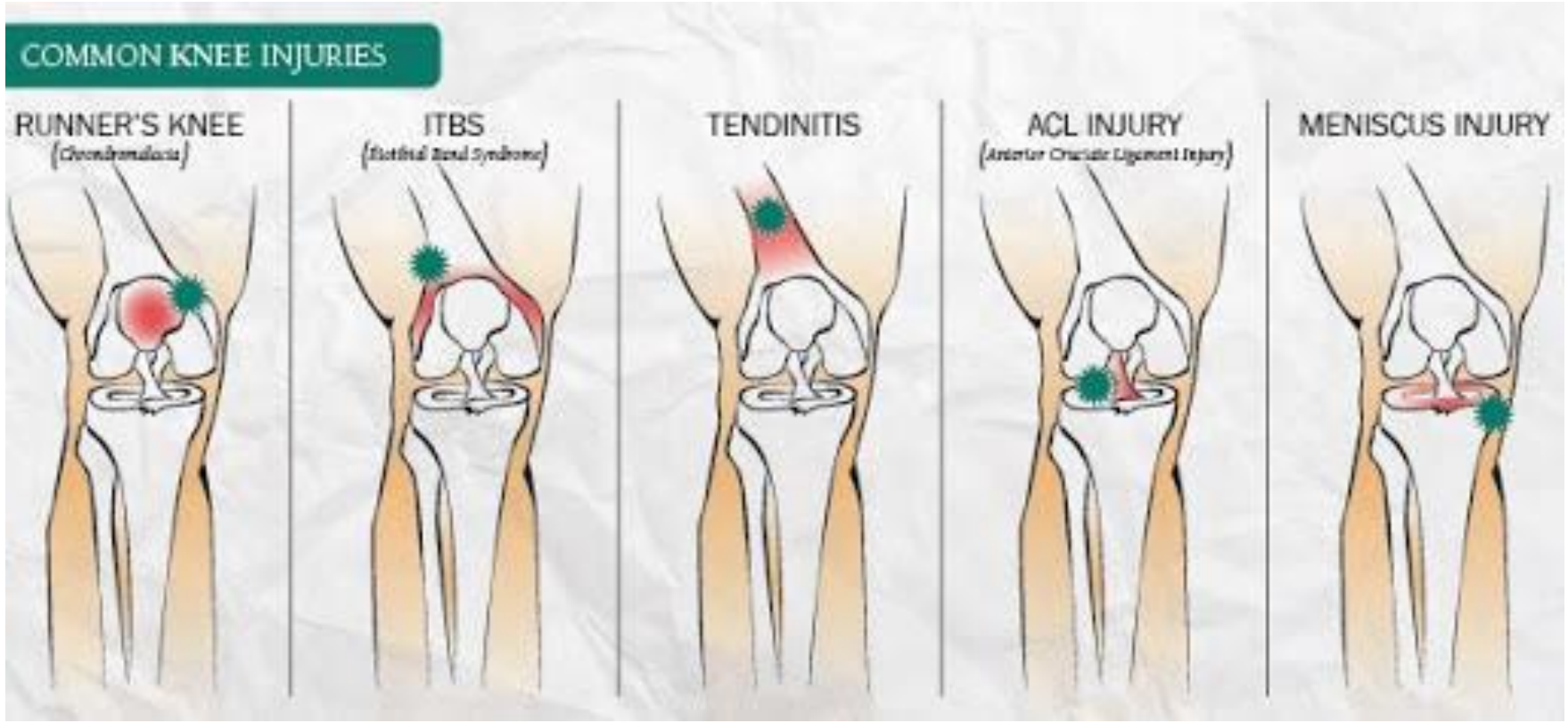


Image: sportsknee.com

Common Injuries in Netball

Table 1. Injury incidence rate of netball injuries

Grade	Injured	Uninjured	Total	Injury incidence rate
A	258	2766	3024	8.5%
B	148	2722	2870	5.2%
C	112	2506	2618	4.3%
D	90	2626	2716	3.3%
Total	608	10620	11228	

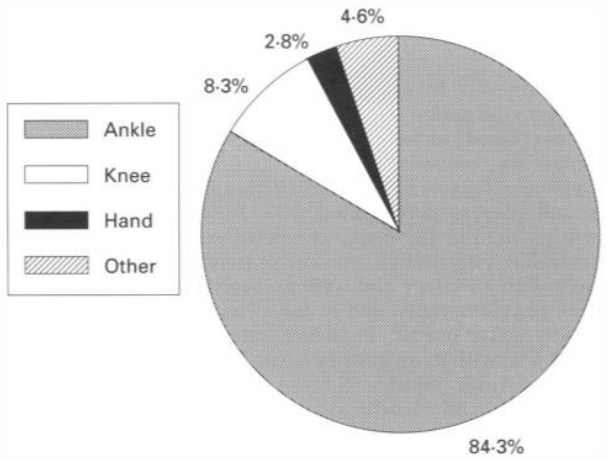
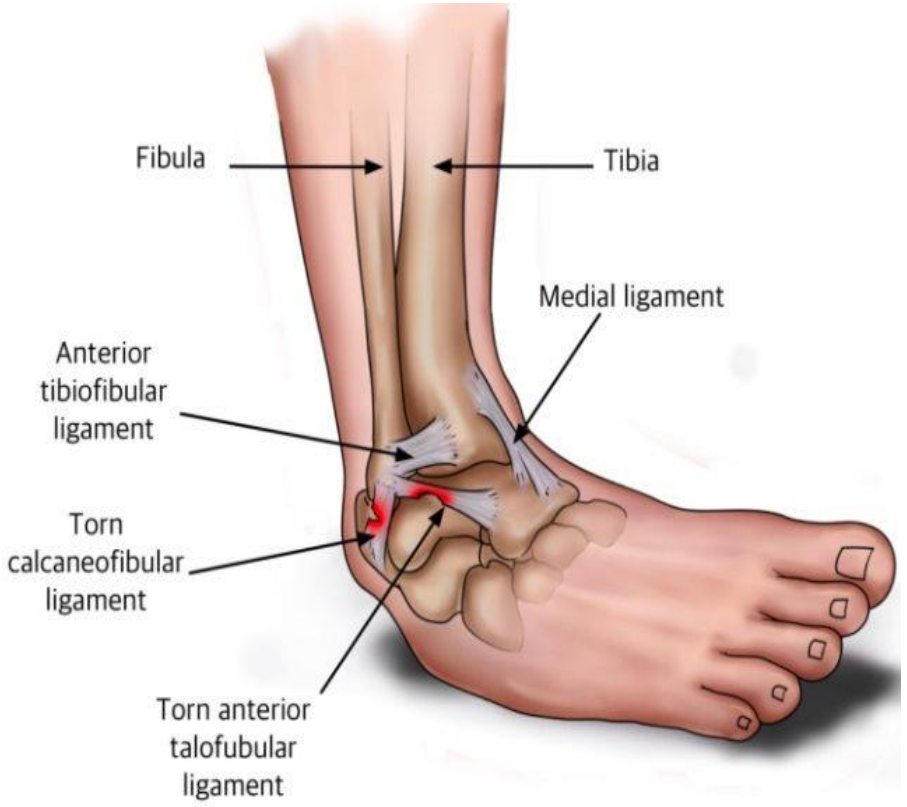


Table 2. Diagnosis and frequency of netball injuries

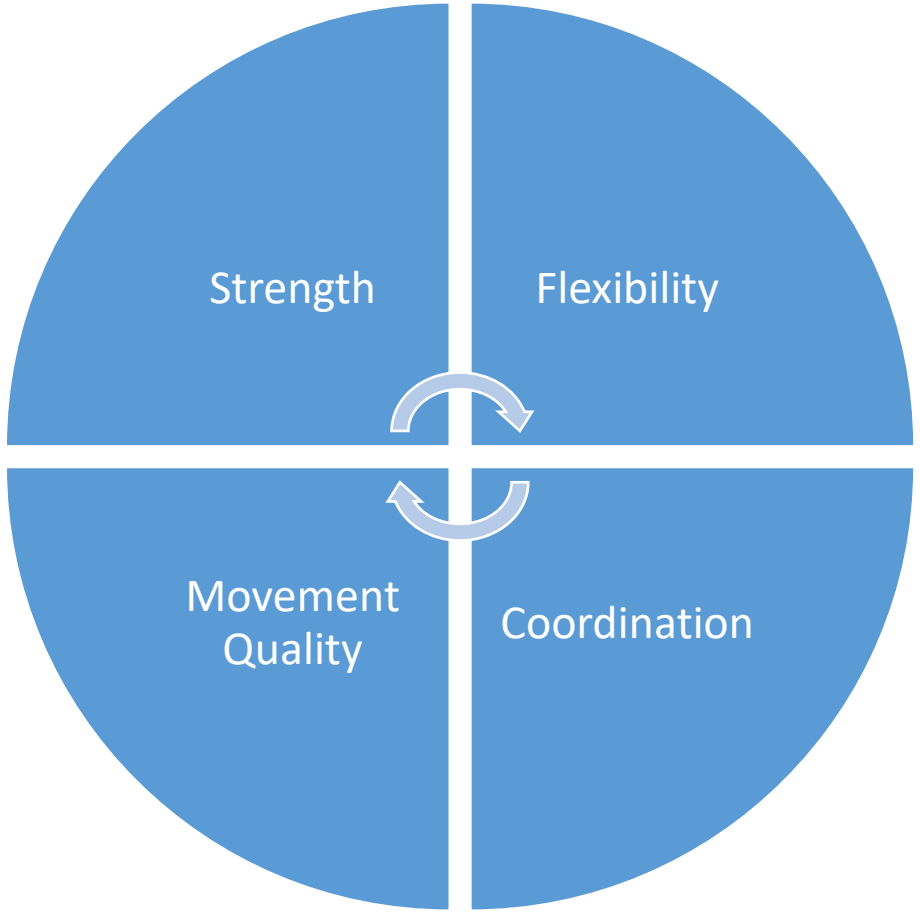
Injuries	Number	Percent
Ankle		
ATFL	288	47.4
ATFL and CFL	67	11.0
ATFL, CFL, PTFL	53	8.7
Deltoid ligament	27	4.4
Bifurcate ligament	5	0.8
Spring ligament	4	0.7
Peroneal tears	8	1.3
Fracture of lateral malleolus	25	4.1
Fracture of medial malleolus	9	1.5
Fracture of cuboid/1st metatarsal	4	0.7
Fracture base of 5th metatarsal	23	3.8
Knee		
Anterior cruciate ligament	11	1.8
Meniscus (lateral and/or medial)	16	2.6
Medial collateral ligament	9	1.5
Lateral collateral ligament	6	1.0
Patellar subluxed or dislocated	8	1.3
Muscle		
Lower leg muscle strain	11	1.8
Lower back muscle strain	3	0.5
Quadriceps haematoma	5	0.8
Upper limb		
Shoulder joint-rotator cuff	3	0.5
Elbow ligament/dislocation/fracture	6	1.0
Finger		
Digital joint sprain/fracture	17	2.8
Grand total	608	

ATFL = anterior talofibular ligament, CFL = calcaneofibular ligament, PTFL = posterior talofibular ligament.



Cumps, E., 2007. Prospective Epidemiological Study of Basketball Injuries During One Competitive Season: Ankle Sprains and Overuse Knee Injuries. *Journal of Sports Science and Medicine*, (6), pp.204-2011.

Remember to evaluate the continuum with your programme and athlete



Images: getty images

Working with court sport athletes

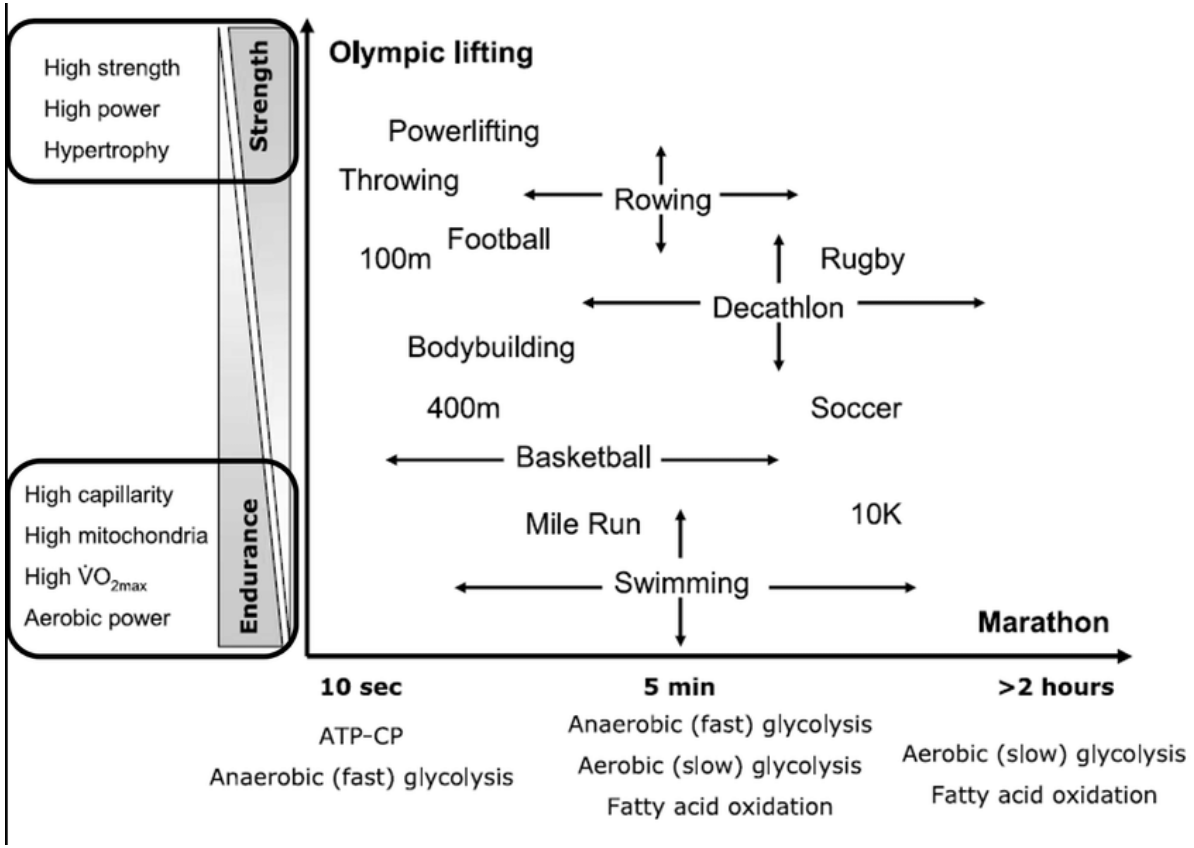


Table 2
A summary of work:rest ratios from author and research

Source	Work:rest ratio
Division I NCAA men's basketball game	1:2
Ben Abdelkrim et al. (1)	1:3.6
Bishop and Wright (2)	1:4-5
ATP-PC energy system	1:6
Ben Abdelkrim et al. (1), Buchheit (3), and McInnes et al. (11)	1:10

Bender, B., 2019. Energy System Development in the Weight Room. *Strength and Conditioning Journal*, 41(5), pp.57-61.

Lee, M., Ballantyne, J., Chagolla, J., Hopkins, W., Fyfe, J., Phillips, S., Bishop, D. and Bartlett, J., 2020. Order of same-day concurrent training influences some indices of power development, but not strength, lean mass, or aerobic fitness in healthy, moderately-active men after 9 weeks of training. *PLOS ONE*, 15(5), p.e0233134.

Working with court sport athletes

	Maximal strength training (*n* = 8)			Conventional strength training (*n* = 8)			Pre–post between groups change		
	Pre-test	**Post-test**	***P***	**Pre-test**	**Post-test**	***P***	**Mean ± SD**	**Cohens' *d***	***P***
1RM (kg)	79.0 ± 18.9	116.2 ± 20.2	<0.001	78.8 ± 19.6	102.4 ± 14.2	<0.001	13.7 ± 8.4	1.07	0.002
RFD_d (N s^{-1})	2,093 ± 852	3,038 ± 837	<0.001	2,061 ± 808	2,419 ± 1,015	0.030	587 ± 679	1.46	0.044
RFD_i (N s^{-1})	5,473 ± 3,255	11,046 ± 3,554	<0.001	5,181 ± 3,252	7,727 ± 3,936	0.028	3,028 ± 3,674	1.11	0.053
PF_d (N)	412 ± 42	526 ± 46	<0.001	424 ± 33	491 ± 53	0.001	47 ± 45	1.16	0.021
PF_i (N)	1,027 ± 266	1,524 ± 247	<0.001	1,043 ± 235	1,293 ± 226	0.004	248 ± 199	1.35	0.010

Values are mean ± SD

1RM, one repetition maximum; RFD_d, dynamic rate of force development; RFD_i, isometric rate of force development; PF_d, dynamic peak force; PF_i, isometric peak force

Heggelund, J., Fimland, M., Helgerud, J. and Hoff, J., 2013. Maximal strength training improves work economy, rate of force development and maximal strength more than conventional strength training. *European Journal of Applied Physiology*, 113(6), pp.1565-1573.

Figure 1

Specificity-based training: Orientation and approach level characteristics

Orientation	Approach Level	Similarity	Training Method	Place	Ball	Decision-making	Confrontation format	Intensity	Main metabolic requirement [*]	Bout duration	Density	Example [**]
COMPETITIVE	V	Basketball	Actual game; Simulated game	On court	With	Actual complexity	4v4, 5vX	Optimal [modified rules?]	All	Required	Required	4-6 x [2-4 min '5v5 game']; 2-4 min rest
SPECIAL	IV	Basketball	Small-sided games	On court	With	Complex	(1v1), 2vX, 2v2, 3vX , 3v3, (4vX)	Optimal, but complexity should not lower intensity [modified rules?]	Manageable [format & rules]	Depending on the main fitness goal	Manageable [format & rules]	4 x [3', 3v3, full-court, no FT, no 3p shots]
DIRECTED	III	Basketball-based	Short HIT [RST-COD]	On court	With / Without	None or simple	1v0, 2v0, (3v0)	'All-out'	Depletion of the stored phosphagens [ATP and PCr]	2-5 s [<60 s]	1 : 5-10	2 x [10 x 5 s @'all-out' - 30 s rest]; 4 min rest
	II	Basketball-based	Short HIT [SIT-COD]	On court	With / Without	None or simple	1v0, 2v0, (3v0)	'All-out'	Anaerobic glycolysis [Lactic acid metabolism]	15-40 s [<60 s]	1 : 3-6	3 x [6 x 15 s @'all-out' - 45 s rest]; 4 min rest
GENERAL	I	Run-based / Basketball-based	Short HIT [SIT-COD?]	Off / On court	With / Without	None or simple	None / 1v0, 2v0, (Xv0)	>VO_2max [ASR]	Aerobic-Anaerobic transition zone	40-60 s [<60 s]	1-2 : 1	4 x [4 x 40 s @ASR – 40 s rest]; 2-4 min rest
		Run-based / Basketball-based	Long HIT	Off / On court	With / Without	None or simple	None / 1v0, 2v0, (Xv0)	>90% VO_2max	Aerobic system [Power / VO_2max]	3-5 min [>60 s]	1-2 : 1	4 x 4 min @90-95% VO_2max; 3 min rest
	0*	Nonspecific [run based]	Continuous or Interval Training	Off court	(With) / Without	None	None	<85% VO_2max	Aerobic system [Capacity]	30-40 min [6-10 min intervals]	2-4 : 1	3-4 x 8 min @75-85% VO_2max; 2 min rest
	0'	Nonspecific	Continuous or Interval Training	Off court	Without	None	None	<70% VO_2max	Aerobic system [Efficiency]	30-40 min	1 : 0	30 min @70% VO_2max

/: or; **?**: optional; **( )**: optional but normally unused; **X**: a number smaller than the indicated firstly (e.g: 3vX = 3v1 and 3v2, but non 3v3 or 3v4).); **ASR**: anaerobic speed reserve (faster than VO_{2max} speed and slower than maximum sprint speed) (9) ; VO_{2max}: maximal oxygen uptake; ATP: adenosine triphosphate; PCr: phosphocreatine; **[*]**: different metabolic processes are closely related and integrated (*continuum energetic*); **[**]**: here are shown only a few examples, there are a myriad of options; **@**: at intensity; **min**: minutes; FT: free throws; 3p: three points

Table 5
Example neuromuscular training program

Training phase	Training focus	Example exercise
Strength endurance mesocycle	Technique and landing mechanics—single plane	Bilateral exercises: drop landings, SJs in place, box jumps, broad jumps, forward jumps over hurdles
		Unilateral exercises: hop and holds, drop landings, split squats, walking lunges, reverse lunges, single-leg balance drills
Strength mesocycle	Eccentric and concentric strength—multiple plane	Bilateral exercises: drop landings, continuous jumps and stick, box jumps, broad jumps, lateral jumps over hurdles, zigzag jumps, 90° jumps
		Unilateral exercises: hop and holds, drop landings, walking lunges, reverse lunges, single-leg balance drills, 90° hops
Power mesocycle	Reactive strength—multiple plane	Bilateral exercises: depth jumps, depth jump to broad jump, continuous tuck jumps, continuous forward jumps over hurdles, box jumps, 180° jumps
		Unilateral exercises: continuous hop and stick, crossover hop, continuous lateral hops, split SJs, 180° hops

SJ = squat jump.

Thomas, C., Comfort, P., Jones, P. and Dos'Santos, T., 2017. Strength and Conditioning for Netball. *Strength and Conditioning Journal*, 39(4), pp.10-21.

Table 6
Example HIT program

Training phase	Mode of HIT	Example session
Strength endurance mesocycle	Long and short intervals	LIT: 5 × 3-min intermittent running (90% MAS/77% V_{IFT}) interspersed with 90 s of passive recovery
		SIT: 2 sets of 12–15 × 15-s intermittent running (120% MAS/102% V_{IFT}) interspersed with 15 s of passive recovery
Strength mesocycle	Short intervals	2 sets of 12–15 × 15-s intermittent running (130% MAS/110% V_{IFT}) interspersed with 20 s of passive recovery
Power mesocycle	SSG	2 sets of 3–4 min games played 4 versus 4, interspersed with 2 min of passive recovery

HIT = high-intensity training; LIT = HIT with long intervals; MAS = maximal aerobic speed; SIT = HIT with short intervals; SSG = small-sided games; V_{IFT} = peak speed reached at the 30-15$_{IFT}$.

Thomas, C., Comfort, P., Jones, P. and Dos'Santos, T., 2017. Strength and Conditioning for Netball. *Strength and Conditioning Journal*, 39(4), pp.10-21.

Skinfold assessment
Identifies body fat percentage. This assessment is to enable the regulation of nonfunctional mass, which would impede performance by reducing propulsion and exercise economy by the muscular system having to continuously overcome the body's inertia.
SJ
Measure of lower-body explosive performance. Allows the calculation of SSC performance using different equations including RSI, EUR, PSA. If coaches have access to a force platform, then the DSI can be calculated by the formula: SJ peak force/ isometric midthigh pull peak force.
Countermovement jump
Measure of lower-body explosive performance
Drop jump (0.3 m)
Measure of an athlete's SSC ability from dividing jump height by ground contact time to determine RSI. Additionally, if equipment is not available to measure ground contact time, researchers and practitioners can simply monitor jump height as the performance measure.
Single hop
Measure of MSA. Using jump tests only performed in one direction may not represent an accurate player profile, as jump performance in one direction may not necessarily predict jump performance in another (49,50). Additionally, horizontal hop tests are commonly used to assess both performance and injury risk (63,68).
5- and 10-m sprint
Evaluation of acceleration and short-sprint performance. Sprint distances are indicative of mean sprint durations during match play (26,34), given netball players rarely sprint distances to achieve a maximum velocity.

Testing That Translates

Modified 505 CODS
Assesses an athlete's ability to change direction. The modified 505 is recommended because of the inclusion of a single change in direction. Furthermore, as 505 time is highly influenced by linear sprint speed, a more isolated measure of CODS can be calculated via the COD deficit formula: mean modified 505 time − mean 10-m sprint time (71).
Isometric midthigh pull
Measure of isometric lower-body strength, which is strongly correlated with jumping (59), sprinting (94), and changing direction (81). Performance of this test requires the use of a force platform to determine an athlete's isometric force-time characteristics.
1RM back squat
Measure of maximum muscular strength, which as described is significantly related to jumping, sprinting, and changing direction. This should only be included once an athletes' technique is of sufficient standard.
$30\text{-}15_{IFT}$
Measure of aerobic and anaerobic capacity, intereffort recovery ability, anaerobic speed reserve, and COD ability. The $30\text{-}15_{IFT}$ allows prescription of individual HIT based on V_{IFT} achieved during the test to achieve the desired physiological responses and adaptations. The velocity attained during the last completed stage is noted as the player's V_{IFT}

$30\text{-}15_{IFT}$ = 30-15 intermittent fitness test; CODS = change of direction speed; EUR = eccentric utilization ratio; HIT = high-intensity training; MSA = muscle strength asymmetry; PSA = prestretch augmentation; RM = repetition maximum; RSI = reactive strength index; SSC = stretch-shorten cycle; V_{IFT} = maximal intermittent running velocity.

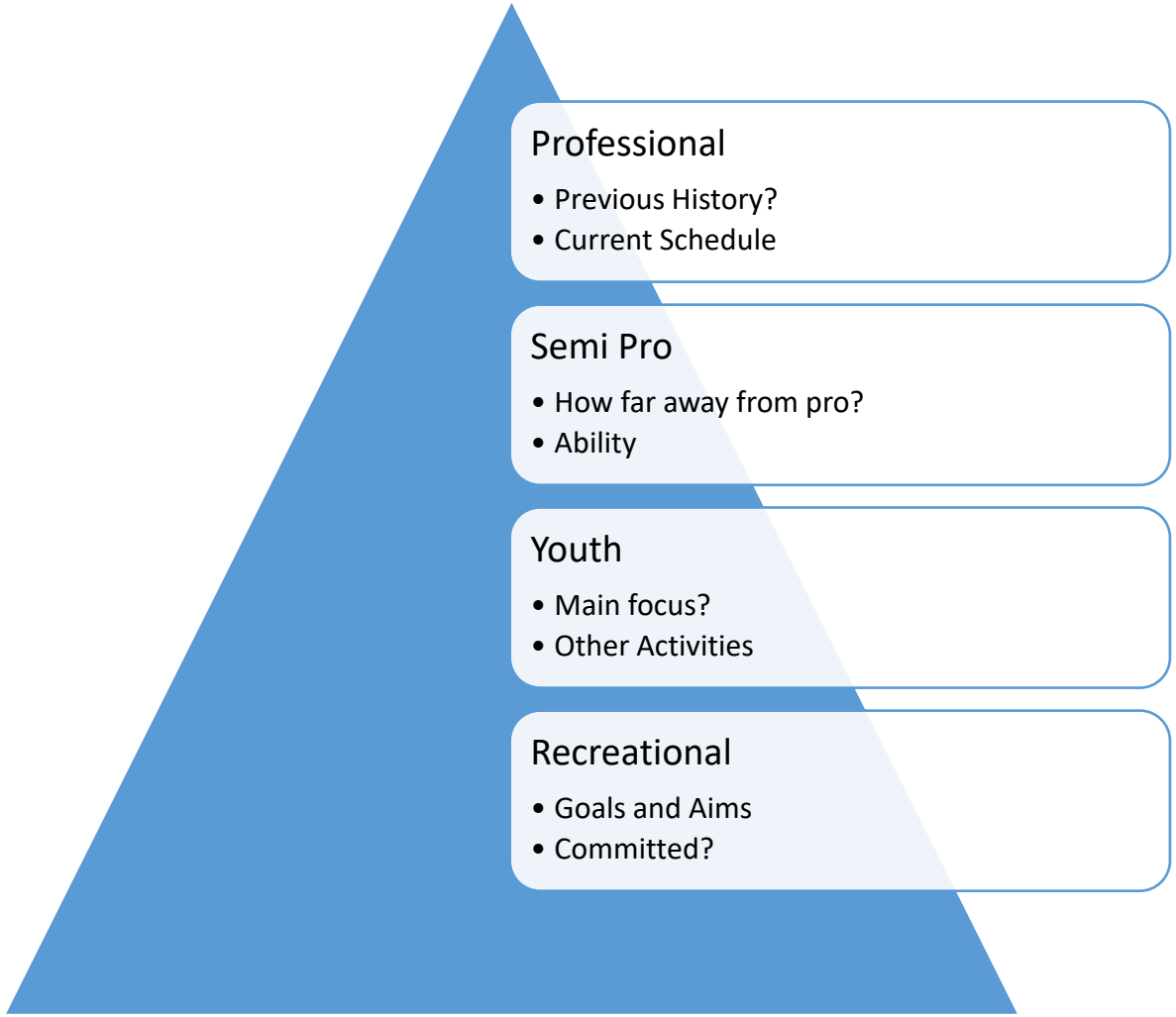
Table 3
Example collegiate basketball linear macrocycle with work:rest prescription

Annual training macrocycle				
Period:	Postseason	Off-season	Preseason	In-season
Time of year	March–May	May–August	August–October	October–March
Phase:	Hypertrophy/endurance	Hypertrophy/basic strength	Basic strength/power	Strength/power/peak
Intensity:	60–75% 1RM	75–95% 1RM	80–95% 1RM	75–100% 1RM[a]
Work:rest	1:2	1:2–1:3	1:3–1:5	1:6–1:10

[a]Broad range to account for high volume of sport.

RM = repetition maximum.

Bender, B., 2019. Energy System Development in the Weight Room. *Strength and Conditioning Journal*, 41(5), pp.57-61.

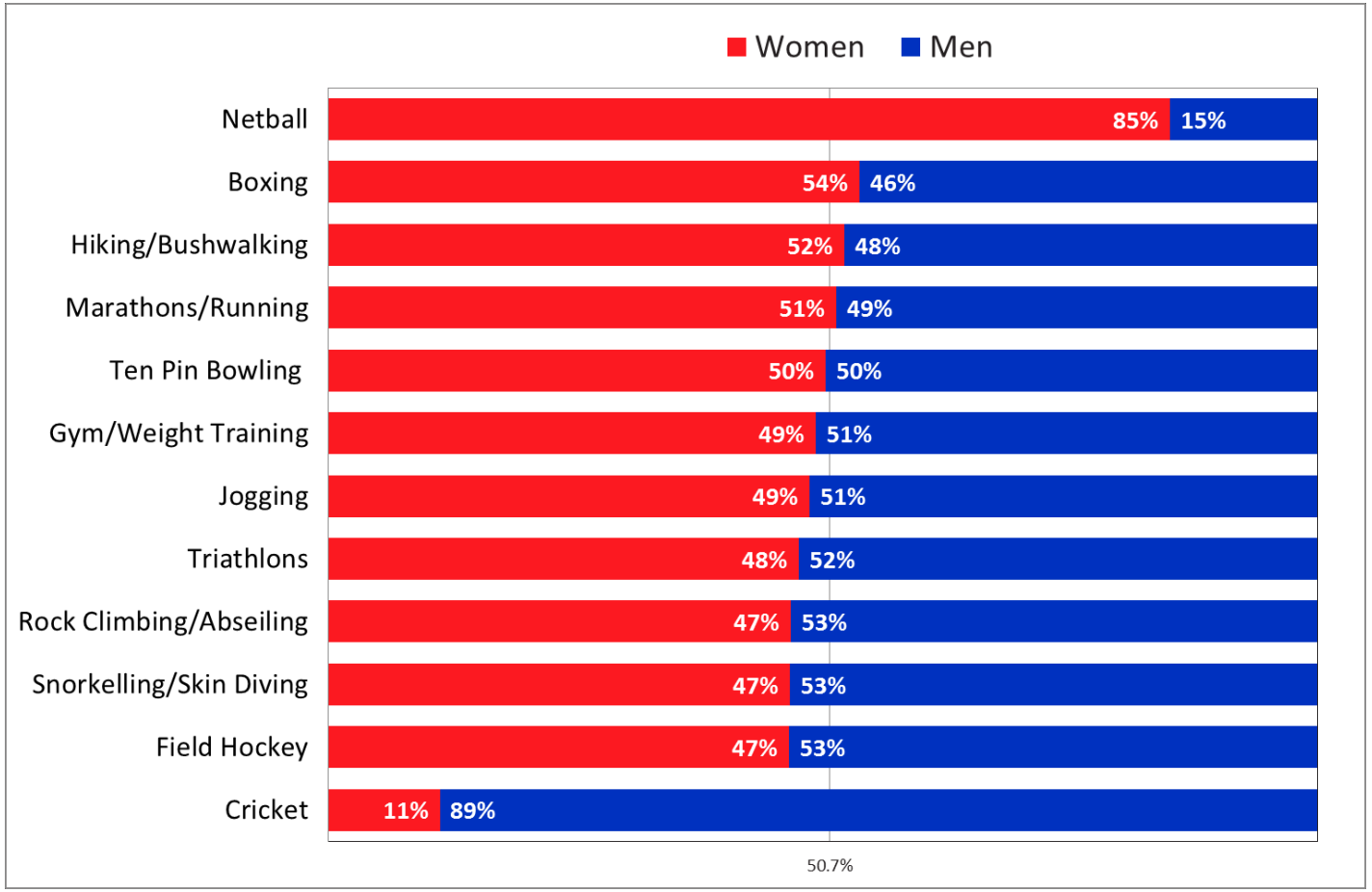


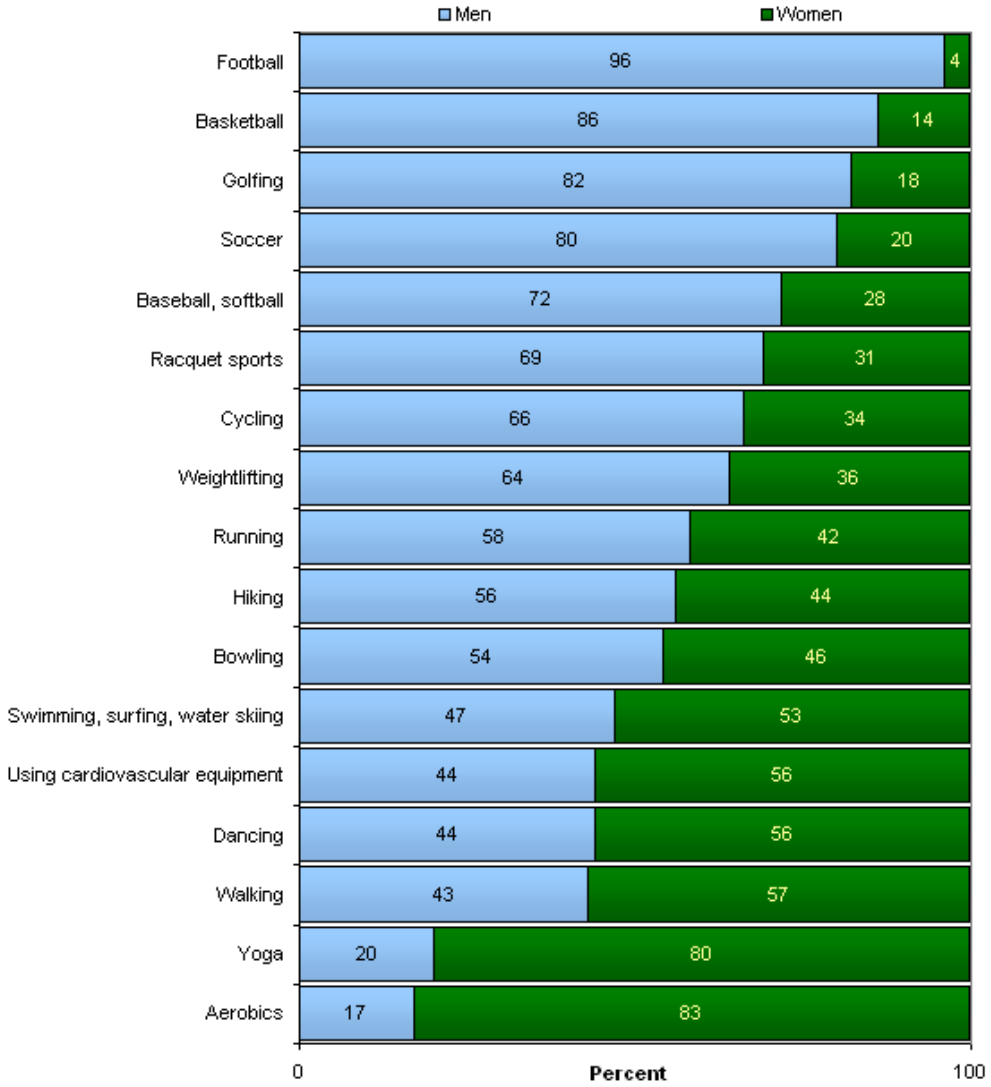
Do you have what you need to move up the pyramid?
Does your athlete want to move up?
Are the aims and goals congruent with schedule?

ECM ELITE COACH MENTORSHIP

STRENGTH & CONDITIONING EDUCATION

Understand the culture within the sport. What environment do your athletes train in?





Understand the culture within the sport. What environment do your athletes train in?

ECM ELITE COACH MENTORSHIP

STRENGTH & CONDITIONING EDUCATION

Elite Coach Checklist

Key Questions	Yes/No	Notes
Can your athlete hit the required kinematics of the sport?		
Are they at risk of injury?		
Have you analysed the environment?		
Do you understand the terminology?		
Does your plan suit the part of the season?		
Does the plan fit the structure and the athlete?		
Are the sessions adaptable?