CAN ANTHROPOMETRICS AND PHYSICAL ABILITIES PREDICT SELECTION FOR INTERNATIONAL COMPETITIONS IN YOUNG ITALIAN RUGBY UNION PLAYERS?

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INTRODUCTION

Rugby Union is a large field sport characterized by high intensity static (rucks, mauls, tackles) and dynamic (sprints, jumps) efforts. **Forward** (FW) players are mostly involved in static, while **backs** (BK) in dynamic efforts. Diverging game demands resulted in marked differences in anthropometrics and physical abilities for different playing positions, with **stronger and heavier players being favoured** for selection for international competitions. Therefore, national federations have resorted to talent identification programs to scout young players' characteristics key for senior international success.

GOALS

1. **Assess** anthropometric and physical **differences** of FW and BK players selected (NAT) or not (INT) for international competitions.
2. **Develop** a **predictive model** to identify players selected for the World Rugby Under 20 Championship.

METHODS

- **Retrospective** study design.
- Data collected for **72** young talent identified Italian Rugby Union Players d over two years.
- **Body composition** was assessed with a 7-sites skinfold equation (%Fat).
- **Countermovement jump height** (CMJh) was assessed with an optoelectric system (Optojump Next, Microgate, Bolzano, Italy) and **peak power** (CMJpp) was estimated with the Evertett et al. equation.
- **Sprint times** and **momentum** over 10 m (10t, 10mm) and 30 m (30t, 30mm) were tested with timing gates (Witty, Microgate, Bolzano, Italy).
- **Maximal strength** was assessed with the One Repetition Maximum test in the **Back Squat** (SQ1RM), **Deadlift** (DL1RM), **Bench Press** (BP1RM), and **Bench Row** (BR1RM) exercises.
- Aerobic fitness with the **Bronco running test**.
- Reliability of the measurements was quantified by a two-way mixed intraclass correlation coefficient (ICC) for average measurements (ICC type 3, k).
- **Two-way ANOVA**, with playing position and selection as between subjects' factors, was completed.
- Variables that presented significant selection effect were tested as independent variables in multiples **logistic regression analysis**, with selection as the dependent variable.
- **Odds ratios** (OR) and 95% conference intervals were also calculated.

RESULTS

- **Reliability was excellent** for all tested variables (>0.964).
- Descriptive statistics are reported in Table 1.
- **No interaction effect** was present for dependent variables (Table 2).
- Significant **position effects** were present for **Height**, **Body mass**, **BMI**, **%Fat**, **CMJh**, **CMJpp**, **10t**, **30t**, **10mm**, **30mm**, **SQ1RM**, **DL1RM**, **BR1RM**, and **Bronco** (Table 2).
- Significant **selection effects** were present for **Body mass**, **CMJpp**, **10mm**, **30mm**, **SQ1RM**, **DL1RM**, and **BP1RM** (Table 2).
- The statistically significant **logistic regression** model only included **SQ1RM** (p=0.015, OR=1.045 [1.009-1.083]) (Figure).

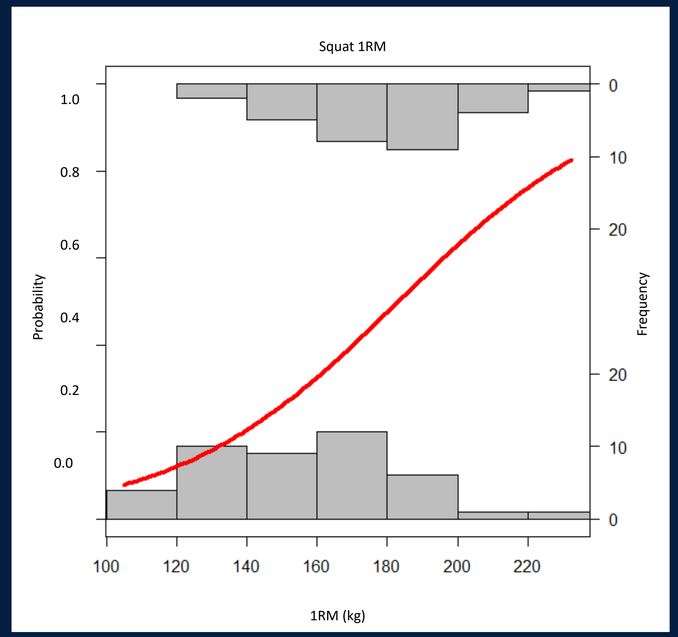
CONCLUSIONS

- **Differences** in body size and physical abilities are **already present at a young age** for FW and BW in Italian talent identified young rugby union players.
- **INT players are bigger, stronger, and more powerful**, especially in their lower body,
- **SQ1RM is the best predictor for selection**.

PRACTICAL APPLICATIONS

Strength & conditioning coaches should prioritize body mass and lower body strength development, with particular emphasis on the back squat for young rugby players irrespective of playing positions.

48 lbs heavier **Back Squat 1RM** **DOUBLES** rugby players' **chances of selection** for World U20 Championship



Logistic regression analysis plot for back squat 1RM. histograms represent the distribution of the players squat 1RM. The line is the predicted probability that a player is selected.

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Table 1: Descriptive Statistics, data presented ad Average ± Standard Deviation

Position	Forwards (n=42)		Backs (n=30)	
Selection	Non-selected (n=27)	Selected (n=15)	Non-selected (n=16)	Selected (n=14)
Age (yrs)	19 ± 0.6	19.4 ± 0.5	18.9 ± 0.5	18.9 ± 0.5
Height (m)	1.89 ± 0.08	1.87 ± 0.06	1.8 ± 0.08	1.83 ± 0.04
Body mass (kg)	108.5 ± 6.9	113.4 ± 8.7	87 ± 8.9	89.6 ± 6.4
BMI (kg·m^{-2})	30.4 ± 3	32.5 ± 2.8	26.8 ± 2.6	26.9 ± 1.7
Fat Mass (%)	0.15 ± 0.04	0.17 ± 0.04	0.11 ± 0.02	0.1 ± 0.02
CMJh (m)	0.38 ± 0.04	0.38 ± 0.05	0.43 ± 0.05	0.45 ± 0.05
CMJpp (W)	5753 ± 249	5928 ± 314	4979 ± 318	5077 ± 233
10t (s)	1.84 ± 0.09	1.83 ± 0.06	1.74 ± 0.07	1.71 ± 0.08
30t (s)	4.41 ± 0.2	4.42 ± 0.11	4.15 ± 0.13	4.08 ± 0.15
10mm (N·m)	590 ± 40	621 ± 50	500 ± 53	525 ± 43
30mm (N·m)	739 ± 50	769 ± 54	630 ± 68	660 ± 60
SQ1RM (kg)	167.8 ± 28.8	189.5 ± 25.8	148.4 ± 19.8	172 ± 15.9
DL1RM (kg)	187.6 ± 27.2	211 ± 22.6	164.1 ± 23.7	176.8 ± 22.1
BP1RM (kg)	122.1 ± 17.7	133 ± 17.6	115.5 ± 21.3	123.6 ± 15
BR1RM (kg)	104 ± 15	112.3 ± 5.6	94.1 ± 15.2	98.6 ± 17.5
Bronco (s)	312.5 ± 15.9	305.8 ± 11.8	281.7 ± 18.4	283.4 ± 13.3

BMI = Body mass index, CMJh = countermovement jump height, CMJpp = countermovement jump peak power, 10t =10 m sprint time, 30t = 30 m sprint time, 10mm = 10 m sprint momentum, 30mm = 30 m sprint momentum, SQ1RM = back squat one repetition max, DL1RM = deadlift one repetition max, BP1RM = bench press one repetition max, BR1RM = bench row one repetition max.

Table 2: Results for the ANOVA

	Selection		Position		INTERACTION Selection x Position	
	F (1, 68)	Sig.	F (1, 68)	Sig.	F (1, 68)	Sig.
Age (yrs)	2.000	0.162	3.677	0.059	1.984	0.164
Height (m)	0.000	0.992	16.004	<0.001*	1.857	0.177
Body mass (kg)	4.050	0.048*	145.918	<0.001*	0.333	0.566
BMI (kg·m^{-2})	2.819	0.098	50.626	<0.001*	2.270	0.137
Fat Mass (%)	0.117	0.734	40.984	<0.001*	2.174	0.145
CMJh (m)	1.132	0.291	27.735	<0.001*	1.873	0.176
CMJpp (W)	4.104	0.047*	144.881	<0.001*	0.318	0.575
10t (s)	1.474	0.229	32.015	<0.001*	0.128	0.721
30t (s)	0.378	0.541	57.878	<0.001*	0.990	0.323
10mm (N·m)	6.375	0.014*	69.338	<0.001*	0.084	0.772
30mm (N·m)	4.545	0.037*	60.811	<0.001*	0.001	0.975
SQ1RM (kg)	14.645	<0.001*	9.726	0.003*	0.023	0.879
DL1RM (kg)	9.068	0.004*	23.162	<0.001*	0.793	0.376
BP1RM (kg)	4.625	0.035*	3.326	0.073	0.098	0.755
BR1RM (kg)	3.441	0.068	11.667	0.001*	0.307	0.581
Bronco (s)	0.447	0.506	51.031	<0.001*	1.290	0.260

BMI = Body mass index, CMJh = countermovement jump height, CMJpp = countermovement jump peak power, 10t =10 m sprint time, 30t = 30 m sprint time, 10mm = 10 m sprint momentum, 30mm = 30 m sprint momentum, SQ1RM = back squat one repetition max, DL1RM = deadlift one repetition max, BP1RM = bench press one repetition max, BR1RM = bench row one repetition max, * = statistically significative effect at the level of p<0.05.

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