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Research article

Global Positioning System Activity Profile in Touch Rugby: Does Training Meet the Match-Play Intensity in a Two-Day International Test Match Series?

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Abstract

This study quantified the match-play activity profiles of international touch rugby and different positional physical outputs in comparison with training specificity. Between November 2019 and January 2020, 82 half-matches and 173 training global positioning system data from 16 national male touch rugby players (mean ± SD: age 23.71 ± 3.90 years, height 1.73 ± 0.05 m, weight 65.38 ± 9.08 kg, touch rugby training experience 6.09 ± 3.31 years) were recorded. The distance covered by wings in half-match (1676.66 ± 444.80 m) was more than that of link (1311.35 ± 223.59 m) and middle (1383.52 ± 246.55 m) by a large effect (partial η^2 = 0.19), which was mainly attributed to walking and jogging (< 4.00 m·s^{-1}). Meanwhile, the middles covered more running distance (4.00-5.50 m·s^{-1}) than other positions. No significant positional group difference was observed for distance covered >5.50 m·s^{-1}, maximum velocity, and the ratio of acceleration and deceleration in matches. Training intensity was close to the match-play outputs only for the high-speed running distance at ≥ 5.50 m·s^{-1}. However, the training activity pattern consistently showed a disparity with the match-play outputs, in terms of shorter normalized training distance covered, less recovery distance covered at ≤ 5.50 m·s^{-1}, higher maximum velocity, and heavier weighting to acceleration in training activities. The current study highlights for the first time that in-match deceleration capacity and active recovery pacing strategy may be essential to touch rugby players. The data provided practitioners a deeper understanding of the physical demands of national touch rugby and allowed them to align the training with the match-play intensity.

Key words: Game Analysis, performance, team sport, football, acceleration.

Introduction

Evidenced-based practice in high-performance sports has gained great interested among stakeholders, but touch rugby has not been probed thoroughly. Touch rugby is well recognized internationally (e.g., Touch World Cup), and 47 member nations in the Federation of International Touch (FIT) owned a touch rugby team. Some regions adapted to introduce conventional rugby to novices of all ages (Kam and Yong, 2017). It is a variation of conventional rugby (i.e., rugby union, rugby sevens, and rugby league) where the contact components (e.g., ruck, scrum, maul, lineout, and tackle) are removed. However, it is still a high-intensity sport, as players' running intensities (Beato et al., 2018) are shown to be higher than those of other rugby variations: rugby sevens (Higham et al., 2012; Higham et al., 2016), rugby league (Gabbett, 2015), and rugby union (Pollard et al., 2018). This could be attributed to the elimination of the game duration and the unlimited interchange.

Touch rugby consists of two teams of six on-field players competing on a maximum pitch size of 70 m × 50 m, excluding the touchdown areas and the interchange areas at two sides. Each team have eight substitute players who stand by in the interchange areas and may replace the on-field players during match at any time. A "touch" is made for defensive tackle that includes any kind of legal body contact between the defender and ball carrier. The entire defensive team retires a minimum of 5 m from the mark as quickly as possible to an onside position. Each team has six touches in each possession prior to a changeover.

With the limited number of studies in touch rugby concerning the levels of playing and the quality of opponents, Beaven et al. (2014) observed higher game intensities of higher-level players. Particularly, international players, compared with the regionals, performed more relative high-speed running (i.e., relative to game time), achieved more peak and average speed, exhibited a lower ratio of low- to high-speed movement (i.e., having less rest after each sprint), and covered more distance through very high-speed running. These phenomena could be attributed not only to physical capabilities and unlimited interchange strategies, but also to the quality of opponents, tactics, and technical abilities (Jennings et al., 2012). FIT revised their playing rules in 2013, that is, the number of players and the match duration were increased from 12 to 14 and from 30 to 40 min, respectively (Federation of International Touch, 2013). To the best of the author's knowledge, the existing literature is not able to provide up-to-date information on international touch match-play profile which is necessary for coaches to enhance training specificity, training prescription, and monitoring (Reilly et al., 2009).

Commercial global positioning system (GPS) has been used to track players' movement patterns in various team sports (Cummins et al., 2013). Higher sampling frequency is usually recognized as more accurate for measurements, such as speed and distance covered, while some higher grade GPS units (Apex 10 Hz and 18 Hz, STATSports, Newry, UK) showed trivial to small differences only in the sports-specific metrics (Beato et al., 2018). High intensity acceleration and deceleration, known as external demands, can also be recorded. The GPS technology allows recording of the players' actual output in every session. However, it does not represent the true match-play demand, which is varied by different factors, such as opposition, weather and athletes' condition (Aughey and Falloon, 2010). The players' activity profile in matches is essential to identify the match-play intensity (Beaven et al., 2014), positional activity patterns (Büchel

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et al., 2019), and training specificity in preparation for match demands (Campbell et al., 2018; Tee et al., 2016a). To date, the investigations of the activity profiles of rugby varieties between their match-play and training have been reported the physical demands. In this study, match-play positional difference and disparity of match and training are expected to be found.

This study focused on the investigation of touch rugby that has not been probed sufficiently. Thus, this study aimed to quantify the match intensity of international touch rugby players under the revised rules of FIT in 2013 and to identify the positional differences in match-play outputs. To the best of the author's knowledge, this was also the first study that directly assessed the specificity of training loads to the real-game situation. As hypothesis, there was an association between the demands in training and matches and significant differences in physical characteristics among the positions.

Methods

Experimental Approach to the Problem

A prospective observational study was employed to determine the duration and position-specific activity profiles of international-level touch rugby players. Each player received an assigned GPS unit for 3 months of data collection. Matches played were at the same touch rugby field, while the training sessions were at varying 4 different training sites.

Participants

Sixteen male touch rugby players (mean ± SD: age 23.71 ± 3.90 years, height 1.73 ± 0.05 m, weight 65.38 ± 9.08 kg) from the same national team provided written informed consent and volunteered to participate in this study. Players were free of injury and engaged in training at the time of data collection. Players had 6.09 ± 3.31 years of touch rugby training experience. Ethical approval for this research was granted by the Human Research Ethics Committee at the Education University of Hong Kong (Ref. no. 2019-2020-0035).

Procedures

GPS data (18 Hz, STATSports, Newry, UK) from 16 national touch rugby players from the same team were collected during field training sessions for 3 months and three competition games over a two-day international test match series in January 2020. The training sessions mainly consisted of small-sized games (Dello Iacono et al., 2019), match-simulation drills (Tee et al., 2016a), and tactical training (Gabbett, 2014), with focuses on specific skills and tactics under match-like situations. Warm-up and cool-down sessions were excluded from the analysis. Match data were recorded and analyzed only if the players were selected for the final 14-player list of each game. The matches consisted of two 20-min halves, and players played six-a-side with unlimited interchanges. Training or half-match observations with less than 1 min of on-field play were excluded from the analysis. As a result, 82 half-match and 173 training data were generated for the analysis. During the data collection, 90.10% attendance rate of training was recorded, and two half-match data were excluded because two players were not assigned to play in two half-matches.

The Apex augmented 18 Hz multi-global-navigation-satellite-system unit (STATSports Apex, Northern Ireland) was placed at the midway between the participants' scapula using a vest. The Apex units were turned on about 10-15 min prior to the data collection, while all participants were well instructed and have familiarized with the data collection procedures. The validity of this device for monitoring sports performance was illustrated (Beato et al., 2018), a small error of ranged from 1.15 ± 1.23% (20 m trial) to 2.11 ± 1.06% (128.50 m circuit), and the ICC of peak velocity detected between the device and radar gun was extremely high at 0.98 (90%CI, 0.96 to 0.99). After each session, data recorded by the units were downloaded and further analyzed by STATSports Apex Software (Apex 18 Hz version 5.0).

Match activities and demands were characterized by the mean of all observed match statistics. Given the discrete roles, players were grouped into one of three positional groups: middle, link, and wings (Federation of International Touch, 2013). Match data were analyzed post-game to compare the positional differences on locomotor metrics per half. Training activities were compared with the data from the three international competition games. Statistics were categorized in the total distance covered (m) and six absolute velocity zones: zone 1 (0-1.50 $m \cdot s^{-1}$), zone 2 (1.50-3.00 $m \cdot s^{-1}$), zone 3 (3.00-4.00 $m \cdot s^{-1}$), zone 4 (4.00-5.50 $m \cdot s^{-1}$), zone 5 (5.50-7.00 $m \cdot s^{-1}$) and zone 6 (> 7.00 $m \cdot s^{-1}$). Absolute high-speed running was the summation of distance covered in zones 5 and 6. Maximal running velocity in each session was recorded. Acceleration and deceleration were defined by changing a speed of 3.00 $m \cdot s^{-2}$ in 0.50 s, while the number of acceleration and deceleration and their ratio were used to indicate physical demands of the training and match (Delaney et al., 2017).

Statistical analyses

Descriptive statistics (mean ± *SD*) were calculated for demographic and outcome variables. Movement variables were normalized by active activity time for comparing training activities and match demands. Before running the parametric tests, Shapiro-Wilk test and/or histograms were used to check data normality. Multivariate analysis of variance (MANOVA) and post hoc test were used to compare differences in locomotor variables between positional groups during matches. Significant main effects were tested by Bonferroni post-hoc procedures. Multiple paired-sample *t*-tests were used to account for the individual differences of normalized physical loads between matches and trainings. Standardized difference (Trainings minus matches) 95% confidence interval (95% CI) of the locomotor variables were reported in the comparison between matches and trainings. The effect sizes (partial eta-squared, η^2 for MANOVA and Cohen's *d* for paired-sample *t*-test) were also calculated. The magnitude of the Partial η^2 values was classified as: trivial (≤ 0.01), small (> 0.01 to < 0.06), medium (> 0.06 to 0.14) and large (≥ 0.14) (Grissom and Kim, 2012) , whereas Cohen's *d* values of 0.20, 0.60, and 1.20 indicate small, medium, and large effect sizes, respectively (Hopkins et al., 2009). Statistical package SPSS version 25.0 was used. Significance was accepted at an alpha level of $p < 0.05$ (two-tailed).

Results

Positional differences during a half-match

The magnitudes of positional differences during matches were clearly identified in most movement variables, but not at the maximum running velocity and acceleration/deceleration outputs (Table 1). A significant positional difference was found on the combined locomotor dependent variables [$F(18, 140) = 5.82$, $p < 0.001$; Wilks' $\Lambda = 0.33$; partial $\eta^2 = 0.42$]. Wings covered a longer total distance (1676.66 ± 444.80 m) during match-play than link (1311.35 ± 223.59 m) and middle (1383.52 ± 246.55 m) did in each half ($p < 0.001$). Particularly, compared with link, the mean distances covered in zones 1, 2, and 3 by wings were longer by 75.49 m (95% CI, 28.27 to 122.70), 251.18 m (95% CI, 157.52 to 344.83), and 78.08 m (95% CI, 13.78 to 142.37), respectively. Compared with middle, wings covered 98.77 m (95% CI, 51.03 to 146.52) and 228.38 m (95% CI, 133.67 to 323.10) more at velocity zones 1 and 2, respectively. When players ran at a moderate high-speed running velocity (zone 4), middle covered more distance than wings (difference: 78.65 m, 95% CI, 27.96 to 129.34) and link (difference: 44.89 m, 95% CI, 2.10 to 87.68). No positional difference was found in the high-speed running zones (zones 5 and 6).

Differences between match-play demands and training loads

Individual running loads in training activities were typically lower than the match demands from moderately to extremely large difference (Table 2). Only the distances covered by high-speed running velocity (zones 5 and 6) shared similar values between training and matches. Players performed similar frequencies of acceleration and deceleration in training; however, this was significantly different from the match-play demand ($p = 0.019$, $d = 0.63$). In this study, players relied more on deceleration during matches. The recorded maximum running velocity was higher in training than in matches ($p < 0.001$, $d = 2.34$).

Normalized distance covered in training was 9.71 $m \cdot min^{-1}$ significantly shorter than that in match (95% CI, 4.46 to 14.96). Less distance in low to moderate velocity zones (1 to 4) was covered in training compared with match-play. The movement of players in velocity zone 3 (3.00-4.00 $m \cdot s^{-1}$) was very high (5.99 $m \cdot min^{-1}$, 95% CI, 4.70 to 7.29) during match-play, compared with training.

Table 1. Physical outputs (mean ± SD) of different positions during three touch rugby games over a two-day international test match series.

	Wing (n = 18)	Link (n = 33)	Middle (n = 31)	*p* value	Effect size (partial η^2)
Total distance (m)	1676.66 ± 444.80 †#	1311.35 ± 223.59 *	1383.52 ± 246.55 *	< 0.001	0.19
Maximum velocity ($m \cdot s^{-1}$)	7.12 ± 0.70	7.09 ± 0.64	6.80 ± 0.52	0.099	0.06
Ratio of Accelerations to Decelerations (Average acceleration: Average deceleration	0.80 ± 0.21 (17.06: 20.67)	0.92 ± 0.28 (13.21: 15.12)	1.01 ± 0.31 (16.45: 17.13)	0.053	0.07
Distance in velocity zones (m)					
zone 1 (0–1.50 $m \cdot s^{-1}$)	414.43 ± 74.47 †#	338.94 ± 73.05 *	315.65 ± 50.91 *	< 0.001	0.25
zone 2 (1.50–3.00 $m \cdot s^{-1}$)	612.16 ± 227.22 †#	360.99 ± 71.25 *	383.78 ± 101.45 *	< 0.001	0.38
zone 3 (3.00–4.00 $m \cdot s^{-1}$)	406.40 ± 125.75 †	328.33 ± 78.82 *	361.10 ± 74.86	0.015	0.10
zone 4 (4.00–5.50 $m \cdot s^{-1}$)	199.67 ± 86.31#	233.43 ± 57.58 #	278.32 ± 71.57 *†	0.001	0.16
zone 5 (5.50–7.00 $m \cdot s^{-1}$)	23.47 ± 15.98	30.35 ± 14.33	31.79 ± 15.26	0.164	0.05
zone 6 (> 7.00 $m \cdot s^{-1}$)	20.52 ± 19.85	19.32 ± 17.90	12.87 ± 9.66	0.163	0.05

* Statistical difference compared with wing; † Statistical difference compared with link; # Statistical difference compared with middle (Bonferroni correction: $p \leq 0.017$).

Table 2. Comparison of activity profiles (n = 16) during national touch rugby matches and training sessions.

	Training	Match	Standardized difference 95% CI	*p* value	Effect Size (*d*)
Total distance per min ($m \cdot min^{-1}$)	60.33 ± 2.59	70.04 ± 9.81 *	-14.96 to -4.46	0.001	0.99
Maximum velocity ($m \cdot s^{-1}$)	7.61 ± 0.28	6.98 ± 0.34 *	0.48 to 0.77	<0.001	2.34
Ratio of Accelerations to Decelerations (min^{-1}) (Frequency of acceleration and deceleration)	0.97 ± 0.15 (45.62: 47.32)	0.89 ± 0.15 * (15.44: 17.42)	0.02 to 0.15	0.019	0.63
Distance in velocity zones ($m \cdot min^{-1}$)					
zone 1 (0–1.50 $m \cdot s^{-1}$)	18.92 ± 1.53	17.03 ± 2.67 *	0.83 to 2.95	0.002	0.95
zone 2 (1.50–3.00 $m \cdot s^{-1}$)	17.30 ± 1.59	21.18 ± 6.10 *	-7.21 to -0.56	0.025	0.62
zone 3 (3.00–4.00 $m \cdot s^{-1}$)	11.69 ± 0.90	17.68 ± 2.33 *	-7.29 to -4.70	<0.001	2.46
zone 4 (4.00–5.50 $m \cdot s^{-1}$)	10.06 ± 1.41	11.87 ± 2.12 *	-2.63 to -0.97	<0.001	1.16
zone 5 (5.50–7.00 $m \cdot s^{-1}$)	1.37 ± 0.23	1.44 ± 0.40	-0.23 to 0.09	0.381	0.24
zone 6 (> 7.00 $m \cdot s^{-1}$)	0.99 ± 0.31	0.84 ± 0.37	-0.02 to 0.32	0.088	0.47

* Statistically significant difference.

Discussion

This study quantified the match intensity of the international touch rugby under the revised rules of FIT in 2013 and identified the positional differences on match-play demands. Perhaps, this is also the first study that directly assessed the specificity of training and the physical loads of international touch rugby games.

In comparison with the limited published results, the 40-min match-play data in this study demonstrated comparable results. The overall total distance of 2773.49 ± 442.48 m was within the range from 2265.80 m in international level to 2970.60 m in regional level (Beaven et al., 2014), respectively. The maximum velocity of 6.98 ± 0.34 $m \cdot s^{-1}$ in matches was close to previous records of 6.94 $m \cdot s^{-1}$ in New Zealand elite touch players (Ogden, 2010) and 7.25 $m \cdot s^{-1}$ in England international touch players (Beaven et al., 2014). However, the rules of touch had been modified since 2013; therefore, the present study would provide a more up-to-date investigation of international touch match demands. Compared to other rugby varieties, such as rugby 7s (e.g. Forwards: 7.50 ± 0.90 $m \cdot s^{-1}$; Backs: 8.00 ± 1.10 $m \cdot s^{-1}$, Higham et al., 2016) and rugby union (e.g. 8.20 ± 1.30 $m \cdot s^{-1}$, Tee et al., 2016a), the maximal velocity reached during the game and the training in touch rugby were also relatively lower. Though the contact phases are removed, ball-carrier needs to slow down for dump on the mark, i.e. put the ball on the ground between feet after being touched. This rule is the nature of touch rugby and it demands players to decelerate quickly instead of running with momentum.

Small to large positional differences in locomotor variables were recorded in match-play. Wings are deemed to be a unique player performing different running characteristics during matches. Compared with link and middle, wings covered longer distances in walking, jogging, and running at < 4.00 $m \cdot s^{-1}$ (Dwyer and Gabbett, 2012). In this study, for each match, three outside players (i.e., wings) and 11 inside players (i.e., link and middle) were listed in the 14-player team list. Obviously, the lower distances covered by the inside players were related to the reduced playing time and the greater number of these players on the field for each match. This finding was similar to that in a previous study in handball (Büchel et al., 2019), which demonstrated a similar game pattern and substitution rules as touch rugby. Substitution and team composition are crucial tactical decisions to enhance or maintain players' effective attack and defensive involvement in rugby varieties (Michael et al., 2019). Prolonged on-field play fatigued players to underperform; thus, reduced total and high-intensity running distance was also observed in rugby union (Tee et al., 2016b) and rugby sevens (Higham et al., 2012). Rolling substitution is a game rule of touch rugby and a game tactics that help mitigate the detriment of fatigue as well as injury incidence (Fuller et al., 2016). During match-play, attacking (such as effective handling and passing) and defensive involvements (such as effective "touch" and forced turnover) usually heavily rely on the inside players. This kind of game pattern could be found in similar team sports, for instance, in handball, backcourt players and pivots performed more high demanding actions in match than wings, such as turns, stops, jumps, and changes in direction (Póvoas et al., 2014). Therefore, the team composition ideally combines more inside players and fewer outside players, allowing the former to share the heavier workload.

On the contrary, the limited number of substitutes requires wings to attain a "physiological reserve" (Waldron and Highton, 2014), allowing them to perform high-speed running during matches when necessary. The greater distance (range, 372.46 to 404.74 m) covered in walking and jogging (velocity zones 1 to 3) by wings could be the results of their self-regulation on running pace. Frequent high-intensity running combined with multiple low-intensity activities allows wings to minimize the physical stress. It is crucial for the wings to adopt an effective pacing strategy (Drust et al., 2007; Waldron and Highton, 2014) to manage their energy resources during a match. As such, it is expected that the locomotor variables of the position differed. The findings of this study supported this notion, where middle players exhibited an extremely greater distance compared with other positions at velocity zone 4, suggesting that they have unique playing demands to cover wider space using relatively high running speed. However, this study did not attempt to quantify the variables regarding ball-in-play time (Gabbett, 2015; Pollard et al., 2018; Ross et al., 2015). As such, future analyses should attempt to include this component of competition to provide a more holistic assessment of the maximum match-play demands, which may then help improve the specificity of touch rugby training.

Another critical finding of this study was the considerable disparity in the locomotor variables between match-play and training demands in national touch rugby players. Compared with match-play demands, training was characterized as having similar or even higher training intensity, for example, higher maximum velocity (extremely large effect size). In match-play, players ran only at their sub-maximal velocity (91.80 ± 3.43% of maximum velocity), which was similar to the case in rugby union (Duthie et al., 2006). The speed difference might be caused by the dynamic environment in competitions. Linear long-distance sprinting and repeated bouts are allowed in training session, while match-play sprinting would be limited in multiple short bouts only (Dwyer and Gabbett, 2012). Practically, running at sub-maximal velocity in matches enables players to perform skills at a faster running speed. Previous studies showed that improved maximal running speed allowed athletes to have a greater repeated sprinting ability (Buchheit and Mendez-Villanueva, 2014) and a wider anaerobic speed reserve (Sandford et al., 2019). In future studies, it is important to determine the type and duration of multiple short bouts in matches and to identify how it relates to the maximum sprinting ability in touch rugby players.

Since there are only minimal resources related to the match-play demands in touch rugby (Beaven et al., 2014), training sessions are designed based on the common understanding of the sport and investigations of rugby varieties. Small-sized games, match-simulation drills, and tactical training are adopted in the training sessions to condition players to accelerate and to develop maximum running velocity as well as prepare specific tactics. In particular, the current finding illustrated similar distance covered in velocity zones >5.50 $m \cdot s^{-1}$ in both match-play and training (Table 2), suggesting that the training intensity matched the actual matches. Small-sized games appear to be the most useful training to match up the actual game demands (Giménez and Gomez, 2019). It is a similar case in preprofessional rugby union training (Campbell et al., 2018), as coaches were more likely to emphasize high-intensity training using a small-sized game approach (Giménez and Gomez, 2019). However, training activities emphasized in skill development and match-based scenarios elicited fewer high-intensity running loads than matches (Campbell et al., 2018; Tee et al., 2016a). The influence of the coaching approach on the training specificity is worth further investigations.

Reviewing the comparison results between the match-play demands and training loads in this study, the low-intensity running and tendencies of acceleration and deceleration may have medium to extremely large differences. Players need to cover a greater distance in matches, predominantly at the velocities from jogging to running. One study, in particular, had similar findings that players jogged more in matches than in training (Tee et al., 2016a), which may be an essential pacing strategy to reserve energy for high-intensity ball-in-play (Drust et al., 2007; Waldron and Highton, 2014). Thus, multifaceted training considerations should be taken into account for high-performance athletic development (Duthie, 2006; Ross et al., 2014). In light of the above, overemphasizing high-intensity training might limit the opportunity for active recovery and hinder players to perform optimally. However, the recent whole-match average analysis may not fully reflect the maximum match-play demand (Pollard et al., 2018). The peak activity profile might better represent the game and training rugby demands (Delaney et al., 2017). Future investigation should be considered to adopt the peak activity analysis approach for maximum intensity demand.

The count of the rapid change of speed (>3m·s^{-2} acceleration : >3m·s^{-2} deceleration, 15.44 : 17.41) in 20-min halves touch rugby match overtopped those demands in other sports, soccer (12 :19 to 14 : 24 in each half, Russel et al., 2016) and international rugby union players (> 60-min play: U20: 4.77 : 9.78 to 7.29 : 14.45 and Senior: 2.89 : 8.78 to 5.94 : 14.29, Cunningham et al., 2016). With the shorter match-play duration, the higher number of rapid changes of speed stress players' capacity in agility. Surprisingly, of the three international matches, heavier reliance was observed on deceleration than on acceleration, and the disparity suggested that the training substantially underprepared players for this particular physical demand, which may be a key to win. Rapid deceleration (≥ 3.00 m·s^{-2} over a period of 0.50 s) is a key component of multidirectional speed and always happens when players slow or stop their centers of mass and regain balance in response to external stimuli or distractions (Chow et al., 2017; Hewit et al., 2011). High-level players adopted multiple running tactics in the attack, which expected players to run fast in response to the flow of play. In contrast, defenders respond to the offensive opponents reactively that need to stop quickly and change their direction. The heavier reliance of deceleration in this study may be due to the stress caused by defensive play, which requires defensive players to move forward and retire 5 m after "touch". However, from the recent data, it is still unclear to tell when and where deceleration moves were practiced. Future studies should investigate the key moments of acceleration and deceleration in touch rugby. To improve the deceleration ability, coaches may consider developing the four major physical components (Kovacs et al., 2015), namely, dynamic balance, eccentric strength, power, and reactive strength. However, according to the new model of agility suggested by Young et al. (2015), together with physical qualities, cognitive and technical qualities should be included in the training. Therefore, integrating deceleration-focused drills (Lockie et al., 2014) with original training designs are deemed necessary to improve the training specificity.

Conclusion

The findings of this study provided a deeper understanding of the positional activity profiles of national touch rugby players and allowed practitioners to align training with real-world games. Small to large positional differences existed on running demands and speed-based variables. The results also demonstrate a large disparity of match-play outputs and training loads on standardized total distance, tendencies of acceleration and deceleration, and the running distance covered in different velocity zones. The greater distance covered in lower velocity zones suggests that during prolonged high-intensity intermittent match-play, players, especially wings, adopted a spontaneous pacing strategy to reserve energy for higher-intensity bouts. Furthermore, coaching and training methodology would differ the training specificity to the actual match demands.

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Key points

- This study highlighted the importance of different positional demands and thus training approaches in touch rugby by showing substantial differences in the total covered distances and relative velocities performed.
- The heavier reliance of players on deceleration than on acceleration during matches.
- Practitioners should consider introducing deceleration-focused drills in addition to small-sided games, match-simulation, and tactical drills.
- The longer jogging distance covered in matches might reflect a need to reconsider the importance of recovery time within a training session. Coaches may integrate more match-simulated scenarios for active recovery.

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