Title: Changes in Physical Performance during British Army Junior Entry, British Army Standard Entry, and Royal Air Force Basic Training

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Abstract

Introduction: To quantify changes in physical performance in men and women during British Army Junior Entry (Army-JE), Standard Entry (Army-SE), and Royal Air Force (RAF) Basic Training (BT). **Design:** Prospective longitudinal study. **Methods:** 381 participants [(339 men, 42 women) *n*=141 Army-JE*; n*=132 Army-SE; *n*=108 RAF] completed a 2-km Run, Medicine Ball Throw (MBT) and isometric Mid-Thigh Pull (MTP), pre- and post-BT. To examine changes in pre- to post- BT physical test performance, for each course, paired students t-tests, and Wilcoxon tests were applied to normally and non-normally distributed data respectively; with effect sizes reported as Cohen's D and with rank biserial correlations, respectively. A one-way between-subjects ANOVA (or Welch ANOVA for non-normally distributed data) compared performance between quartiles based on test performance pre-BT. Where the main tests statistic, *p* value and effect sizes identified likely effect of quartile, *post-hoc* comparisons were made using Games-Howell tests with Tukey's *p* value. Data are presented as mean ± standard deviation, statistical significance set at $p<0.05$. **Results:** During BT, 2-km run time improved by 13±46 (-2.1±8.1%), 30±64 (-4.8±12.3%), and 24±27 s (-4.5±5.1%) for Army-JE, Army-SE, and RAF, respectively (all $p<0.005$). MBT distance increased by 0.27±0.28 m (6.8±7.0%) for Army-JE ($p<0.001$) and 0.07±0.46 m (2.3±10.9%) for Army-SE ($p=0.040$), but decreased by 0.08±0.27 m (-1.4±6.0%) for RAF ($p=0.002$). MTP force increased by 80±281 N (10.8±27.6%) for Army-JE ($p<0.001$) and did not change for Army-SE (-36±295 N, -0.7±20.6%, $p=0.144$) or RAF (-9±208 N, 1.0±17.0, $p=0.603$). For all tests and cohorts, participants in the lowest quartile of pre-BT performance scores demonstrated greater improvements, compared with participants in the highest quartile (except Army-JE MBT; Δ% change similar between all quartiles). **Conclusions:** Changes in physical performance were observed for the three fitness tests following the different BT courses, but recruits with the lowest strength and aerobic fitness experienced greatest improvements.

Practical Implications

- **What is already known on this topic –** Recent studies of Australian and Finnish military recruits have reported individual or sub-group changes by different levels of physical fitness at the start of military training. Therefore, it was important to identify any similarities in the UK Armed Forces while also comparing to whole-group comparisons.
- **What this study adds –** First study to quantify changes in physical performance during Army-JE, Army-SE, and RAF BT in the UK Armed Forces at both a whole-group level and relative to recruits' physical performance pre- BT.
- **How this study might affect research practice or policy –** Differences in sub-group changes highlight the potential of streaming recruits at the start of their training to enable training load to be more effectively prescribed at a sub-group level to optimise adaptations in physical development.

Introduction

Basic Training (BT) is used generically by international defence forces to develop civilians into trained soldiers[1]. In the UK, BT lasts between 10 and 49 weeks with the content covering basic military skills, physical training, and education[2]. To successfully perform in their future military roles, recruits are required to develop both the physical fitness and technical capability of core soldiering tasks including prolonged load carriage, casualty evacuations, tactical movement, moving over/through obstacles and material manual handling. Physically these tasks require aerobic endurance, anaerobic endurance, muscle strength, muscle endurance, and flexibility[3]. Developing these physical capabilities is an important requirement of BT.

Military training is a systematic process, during which soldiers aim to improve their fitness according to known training principles, such as overload, specificity, and variety[4,5]. However, physical training during BT is typically performed in groups at a fixed pace or intensity for a given duration. Therefore, despite being considered important factors affecting training adaptations, individual differences in training history and initial fitness level are not considered in the prescription of military physical training[6]; which may result in detraining for those with higher initial fitness. At the population level, improved physical performance during BT has been consistently reported in aerobic endurance[1,7–11], but muscle strength and endurance have been shown to increase[9], remain unchanged[10,11], or decrease[10,11].

Recent studies have reported individual or sub-group changes by different levels of physical fitness at the start of military training[12–14]. Burley *et al* (2018) showed that following 12-weeks of Australian Army BT, recruits in the lowest performance quartiles on four different fitness tests (20 m multi-stage fitness test, 2 min push-up test, 1 repetition maximum box lift, and 3.2-km load carriage) showed the largest improvements compared to those in the highest baseline fitness quartile[13]. Similarly, Pihliainen *et al* (2020) reported that during 24-52 weeks of conscripted Finnish military service, performance on four different fitness tests (12 min run, standing long jump, 1 min push-up, and 1 min sit-up) improved in recruits in the lowest two baseline fitness quartiles in all tests, while performance decreased in recruits in the highest fitness quartile[14].

In the British Army, recruits undertake one of two Army-JE BT courses if they are <17.9 years at the start of training, which is either a short course (23 weeks) or a long course (49 weeks) depending on job role. British Army recruits ≥17.9 years at the start of training complete a 14- or 26-week Army-SE BT course. All RAF recruits complete a standard 10-week training course. The differences in training course content, duration and recruit characteristics may result in variation in the changes in physical fitness test performance during the course.

In 2019, the British Army and RAF Regiment adopted three new fitness tests which are used to assess applicants and recruits; 2-km Run, Medicine Ball Throw (MBT) and isometric Mid-Thigh Pull (MTP). However, changes in performance on these tests at the whole group level, and differences between recruits with the highest and lowest performance pre-BT have not previously been examined. In addition, no previous studies have examined changes in fitness test performance during an Army-JE BT

course. The aims of this study are to quantify changes in physical performance pre- and post-BT using the physical fitness tests of 2-km Run, MBT, and MTP for Army-JE, Army-SE, and RAF recruits: (1) at the whole-group level, and (2) relative to recruits' pre-BT physical performance.

Methods

An original sample of 545 recruits gave informed consent to participate, however 164 datasets were incomplete for various reasons (Figure 1). A final sample of 381 recruits (339 men, 42 women) partaking in either Army-JE [*n* = 141 (10 women); Age, 16 ± 1 yrs, Body Mass, 68.6 ± 9.2 kg, Stature, 1.74 ± 0.07 m], Army-SE [*n* = 132 (22 women); Age, 21 ± 4 yrs, Body Mass 71.7 ± 11.1 kg, Stature, 1.75 ± 0.09 m], or RAF [*n* = 108 (10 women); Age, 21 ± 3 yrs, Body Mass, 71.4 ± 9.9 kg, Stature, 1.75 ± 0.07 m] BT courses completed the study. Participants were provided with a comprehensive verbal and written brief of the study requirements and gave signed informed consent. For participants under the age of 18, parental consent was received. All recruits passed an initial medical assessment as required to commence BT and declared fit to train. The study was approved by the Ministry of Defence Research Ethics Committee (Application no: 804MoDREC17). The manuscript was reviewed by the funding organisation (Ministry of Defence) and approved for publication.

INSERT FIGURE 1 HERE

Participants completed two testing sessions; one in the first week of BT (pre-BT) and one in the final week of BT (post-BT (Army-JE, week 48; Army-SE, week 13; RAF, week 9)). All testing sessions were conducted at the locations where recruits were undertaking their BT and fitness tests were administered by physical training instructors and researchers.

Following standardised procedures, participants stature was measured to the nearest 0.5 cm (SECA 213, Seca Ltd, Birmingham, UK) pre-BT. Body mass was measured to the nearest 0.1 kg (Seca 770, Seca Ltd, Birmingham, UK) pre- and post-BT. After a 500 m warm-up led by physical training instructors, participants completed the fitness tests to an individual best effort, where the 2-km Run was completed first, followed by the MBT and MTP in a randomised order. A minimum of 5 minutes rest was given between tests and participants wore issued physical training shorts, t-shirt, and running shoes.

The 2-km run was conducted along a pre-measured flat tarmac outdoor route unique to each test location. Time to complete the 2-km Run was recorded to the nearest second.

The MBT was conducted using a 4 kg medicine ball (Loumet medicine ball, Perform Better Ltd, Southam, UK). Participants sat against a wall with their legs placed straight out in front with the medicine ball positioned at chest height and elbows facing down. When instructed to go, participants pushed the medicine ball upwards and outwards as far as possible using a chest press technique, keeping their back in contact with the wall. Participants completed one familiarisation throw followed by two best-effort attempts, each separated by a minimum of 30 s recovery. Throw distance of both best-effort

attempts was measured from the wall behind the participant to the landing point of the ball and recorded to the nearest 0.05 m. The furthest recorded distance was used for analysis.

The MTP was conducted using a specialist MTP rig (AP-IPAT01, Absolute Performance Limited, UK), with two force plates (Pasco PAS010660, Scientific and Chemical Supplies Ltd, UK) positioned at the base. Participants stood, feet shoulder-width apart and knees flexed, with each foot centred on each force plate. Wearing lifting straps (RDX W5 LARUS, RDX Inc., Manchester, UK), participants held a bar using an overhand grip while maintaining a forward-looking head posture, keeping their back and arms straight. The bar height on the frame was set to acquire a hip angle between 140-150˚ and a knee angle between 120-135˚ [15], this remained constant for each participant across sessions. During the initial squat phase, recruits were instructed to "take up the slack" on the bar and then after a pause, pull upwards "hard and fast" for ~5 s to maximise rate of force development and peak force[16]. Following two familiarisation attempts, the participants completed two best-effort attempts separated by a minimum of 60 s recovery. The peak force was recorded on each force plate, then summed and averaged with the overall mean peak force recorded to the nearest Newton. The highest peak force generated was used for analysis.

Between the pre- and post-BT testing sessions, all participants followed their normal BT programme. All courses consisted of a combination of lessons and activities covering military skills, physical training, field training exercises, foot drill, practical and classroom lessons. The course durations were 49-, 14-, and 10- weeks for Army-JE, Army-SE, and RAF, respectively.

Statistical analysis was conducted using JASP (v0.16.3, University of Amsterdam, Netherlands), with data presented as mean ± standard deviation. Data normality were assessed using Shapiro-Wilk. To examine changes in pre- to post- BT physical test performance, for each course, paired students t-tests, and Wilcoxon tests were applied to normally and non-normally distributed data respectively; with effect sizes reported as Cohen's D and with rank biserial correlations, respectively. To further examine these changes, participants were classified into quartiles (Q1-Q4), based on their pre-training physical test performance scores; with Q1 reflecting the poorest performers and Q4 reflecting the best performers. For normally distributed data this analysis was conducted using a one-way between-subjects Analysis of Variance (ANOVA). For non-normally distributed data this analysis was conducted using a Welch ANOVA. Where the main tests statistic, p value and effect sizes indicated likely effect of quartile, *post-hoc* comparisons were made using Games-Howell test with Tukey's p value (i.e. Q1 vs Q2, Q1 vs Q3, Q1 vs Q1, Q2 vs Q3, Q2 vs Q4, and Q3 vs Q4). Cohen's D effect sizes and 95% confidence intervals (CI) were additionally calculated for these *post-hoc* comparisons.

Results

Table 1 summarises the whole group level pre- and post-BT performance on the 2-km Run, MBT, and MTP for the Army-SE, Army-JE, and RAF cohorts. The 2-km Run time improved by 2.1% in Army-JE (p<0.001), 4.8% in Army-SE (p<0.001) and 4.5% in RAF (p<0.001) recruits. The MBT distance

increased by 6.8% for Army-JE (p<0.001) and 2.3% for Army-SE (p=0.040), but decreased by 1.4% for RAF (p=0.002) recruits. The MTP force increased by 10.8% for Army-JE (p<0.001), but did not change for Army-SE (-0.7±20.6%, p=0.144) and RAF (1.0±17.0%, p=0.603) recruits.

INSERT TABLE 1 HERE

Table 2 shows pre- and post-BT performance for the 2-km Run, MBT and MTP for the Army-SE, Army-JE, and RAF cohorts for quartiles based on participants' pre-BT physical fitness test performance. Figure 2 illustrates the individual absolute changes in performance pre- to post-BT for each participant for the 2-km Run, MBT, and MTP for each cohort.

INSERT FIGURE 2 HERE

For all courses, greater improvements in 2-km Run performance were observed in participants in the slowest performing quartile (Q1) compared with the fastest performing quartile (Q4) during BT (p<0.005 for all courses). In Army-JE, the quartile with fastest run times pre-BT (Q4) showed a 3.9% decline in performance (p<0.001), whereas the quartile with the slowest run times (Q1) showed an 8.7% improvement (p<0.001). In Army-SE, the quartile with fastest run times pre-BT (Q4) showed no change in performance (5.5%, p=0.094), whereas the quartile with the slowest run times (Q1) showed an 11.4% improvement (p<0.001). In RAF, the quartile with fastest run times pre-BT (Q4) showed a 1.8% improvement in performance (p=0.006), whereas the quartile with the slowest run times (Q1) showed a 7.3% improvement (p<0.001).

For the MBT, with the exception of Army-JE, greater improvements in performance were observed in participants in the lowest performing quartile (Q1) compared with the highest performing quartile (Q4) during BT (Army SE, p<0.001; RAF, p=0.002). Army-SE recruits in the lowest performing quartile (Q1) showed a 9.7% improvement in performance (p<0.001) and those in the highest performing quartile (Q4) showed no change (-2.6%, p=0.072). Whereas, in RAF, those in the highest performing quartile (Q4) showed a 3.3% decline in performance (p<0.001) and those in the lowest performing quartile (Q1) showed no change (2.6%, p=0.074). In the Army-JE cohort, there was no difference in the change in performance during BT between quartiles, where improvements in performance were observed in the lowest (Q1, 9.2%, p<0.001) and highest performing quartile (Q4, 4.7%, p=0.001).

For all courses, greater improvements in MTP performance were observed in participants in the lowest performing quartile (Q1) compared to the highest performing quartile (Q4) during BT (Army-JE, p=0.001: Army-SE, p<0.001; RAF, p =0.002). In Army-JE, the quartile with lowest MTP force pre-BT (Q1) showed a 24.4% increase in performance (p<0.001), whereas the quartile with the highest MTP force pre-BT (Q4) showed no change (-2.8%, p=0.202). In Army-SE, the quartile with lowest MTP force pre-BT (Q1) showed an 11.0% increase in performance (p=0.029), whereas the quartile with the highest MTP force pre-BT (Q4) showed a 13.8% decline (p<0.001). In RAF, the quartile with lowest MTP force pre-BT (Q1) showed a 12.1% increase in performance (p=0.019), whereas the quartile with the highest MTP force pre-BT (Q4) showed a 7.0% decline (p=0.006).

INSERT TABLE 2 HERE

Discussion

This study aimed to quantify changes in physical performance during Army-JE, Army-SE, and RAF BT in the UK Armed Forces at a whole-group level and relative to recruits' physical performance pre- BT. These changes in physical performance were quantified using the new point of entry tests recently adopted by the British Army to assess applicants (2-km Run, MBT and MTP). At the whole-group level, 2-km Run time improved in all BT courses, MBT distance improved for both Army-JE and Army-SE recruits, whereas MTP force improved for Army-JE only. Additionally, for all courses, individuals in the lowest physical performance quartile pre-BT demonstrated greater improvements compared to those in the highest quartile, for the 2-km Run and MTP. A similar pattern was observed for the MBT for both Army-SE and RAF, however for Army-JE no difference between quartiles was observed.

The improvements in 2-km Run time during BT for Army-JE (2.1%), Army-SE (4.8%), and RAF (4.5%) are consistent with those reported in other military training courses[7–11]. Physical adaptations during training will be influenced by the volume (duration, distance or repetitions), intensity (load, velocity or power), frequency and type of physical activity[17]. Therefore, the changes in 2 km Run time for recruits is likely to have been due to the total sum of physical activity in BT and the specific physical training completed to improve aerobic endurance (e.g., load carriage and running)[14,18,19]. While improvements in aerobic fitness, measured using predictive or absolute measures of maximal oxygen consumption, have consistently been shown during BT[7–9], changes in performance on tests which measure muscle strength, muscle endurance, and power are more variable. For example, at the whole-group level, studies have shown improvements in sit-up and push-up test performance[9,13], decrements in maximal jump performance[11], and no change in back extension strength[10] or standing long jump performance[18]. As manual handling tasks are critical to military occupations and require high levels of muscular strength and endurance[20–22], it is important to ensure these components of fitness are developed during BT and further initial trade training.

In this study, upper body muscular power was quantified using the MBT and lower body muscular strength was quantified using the MTP. The MBT has also previously been shown to be associated with skeletal muscle mass and correlated with lower body power[23]. At the whole-group level, MBT performance improved during BT for Army-JE and Army-SE recruits, however there was a small decrease in performance for RAF recruits. Additionally, Army-JE demonstrated a significant improvement in MTP performance with no change observed for Army-SE and RAF recruits. These differences between Army-JE compared to Army-SE and RAF could be attributable to a number of factors. Firstly, the longer duration (49 weeks) of training programme content of Army-JE BT compared to Army-SE (14 weeks) and RAF (10 weeks) may have provided greater opportunity for exercise familiarisation, strength specific physical training principles, periodisation and recovery, resulting in training adaptations for performance induced changes in muscular strength[17,24]. Secondly, the lack of positive physical adaptation in Army-SE and RAF recruits could be attributable to an insufficient training stimulus which could be reversible with the prescription of relative exercise intensities[13,25].

The results of this study from three UK Armed Forces BT courses show for the first time that overall participants in the lowest performance quartiles on the 2-km Run, MBT, and MTP pre-BT demonstrate greater improvements compared to those with the highest physical performance. These data are supported by recent studies in Australian Army and Finnish military training which have shown that participants with the lowest levels of physical fitness test performance at the start of training typically demonstrate the greatest improvements during training[12–14]. The variability in performance gains has previously been attributed to an insufficient training stimulus for those with highest baseline fitness levels[9,13,25]. The magnitude of the changes in those participants with the lowest physical performance scores were 9%, 11% , and 7% for the 2 km run, 9%, 10% and 3% for the MBT, and 24%, 11% and 12% for the MTP in Army-JE, Army-SE and RAF recruits, respectively. Despite differences in test protocols, these changes are similar to those observed in Australian Army BT for the 20 m multi-stage fitness test (12%) and 1 repetition maximum box lift (21%)[13]. Together, the evidence suggests, systematic exposure of recruits to higher relative intensity exercise may be valuable in all recruits for the development of both cardiovascular and muscular fitness.

A limitation of this study is that it was not possible to document the frequency, intensity, time, and type of physical activity in each course, this information would have allowed us to identify if there was sufficient training stimulus for the improvement of cardiovascular and muscular adaptations within each BT course. Additionally, measurements of physical fitness test performance were only taken pre and post-BT course, more frequent measures may have allowed for the identification of plateaus in physical fitness during training, particularly in those individuals with higher physical fitness pre-training. Future research should take more frequent measurements of physical fitness test performance (e.g., every 4-6 weeks) and quantify physical activity during training using techniques such as training logs or wearable physical activity monitors.

In conclusion, the present study has shown that rather than solely relying on whole-group data, sub-group or individual changes should be used to quantify changes in physical fitness test performance during UK and other Armed Forces BT. Given that differences in sub-group changes were observed for the 2-km Run, MTP and MBT tests in the present study, it is important to adopt this approach to quantify changes in aerobic endurance, muscular power and muscular strength during BT. These data and the straightforward technique of dividing recruits into test-specific pre-BT test performance quartiles could be used to stream recruits at the start of their training to enable training load to be more effectively prescribed at a sub-group level to optimise adaptations in physical performance for all recruits.

Authorships: CAR was a major contributor in writing the manuscript. CAR, BJH, SLC and KMA analysed and interpreted the data. BJL, AGS, SCN-B, KLH, JIO, FSW, CAJV, JD, TRF, and EFW collected and input the data. SDM, SDB, SLW, JPG and AF supervised the preparation, conduction and evaluation of the study.

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Table 1: Whole-group level performance for the 2-km Run, Medicine Ball Throw (MBT) and Mid-Thigh Pull (MTP) pre- and post- Basic Training (BT) for Army Junior Entry (Army-JE), Army-Standard Entry (Army-SE) and Royal Air Force (RAF). Changes are presented as absolute (Δ) and relative (%Δ) differences (Mean ± SD).

Cohort	Test	n	Pre-BT	Post-BT	Absolute Δ	% Δ	Test Statistic	*p*	Effect Size	95% CI
Army-JE	2-km Run (min:s)	139	08:50 ± 00:59	08:36 ± 00:47	-00:13 ± 00:46	-2.1 ± 8.1	W=6269.50	0.002	0.307	[00:07, 00:28]
	MBT (m)	141	4.06 ± 0.56	4.32 ± 0.59	0.27 ± 0.28	6.8 ± 7.0	*t*=11.218	<0.001	0.940	[-1.14, -0.75]
	MTP (N)	138	1223 ± 400	1300 ± 365	80 ± 281	10.8 ± 27.6	W=3088.00	<0.001	0.356	[-0.511, -0.178]
Army-SE	2-km Run (min:s)	126	09:01 ± 00:59	08:32 ± 00:56	-00:30 ± 01:04	-4.8 ± 12.3	W=6308.50	<0.001	0.577	[00:25, 00:41]
	MBT (m)	132	4.33 ± 0.83	4.40 ± 0.81	0.07 ± 0.46	2.3 ± 10.9	W=3155.00	0.040	0.211	[-0.39, -0.01]
	MTP (N)	132	1405 ± 468	1369 ± 400	-36 ± 295	-0.7 ± 20.6	W=5032.50	0.144	0.147	[-0.05, 0.33]
RAF	2-km Run (min:s)	100	08:31 ± 00:48	08:07 ± 00:43	-00:24 ± 00:27	-4.5 ± 5.1	W=4431.00	<0.001	0.827	[00:44, 00:53]
	MBT (m)	108	4.61 ± 0.70	4.53 ± 0.65	-0.08 ± 0.27	-1.4 ± 6.0	W=1774.50	0.002	0.428	[0.19, 0.62]
	MTP (N)	100	1340 ± 343	1342 ± 336	-9 ± 208	1.0 ± 17.0	W=2624.50	0.603	0.060	[-0.17, 0.28]

Note: For the student t-test, effect size is given by Cohen's *d*. For the Wilcoxon test, effect size is given by the matched rank biserial correlation (r_{rb}).

Table 2: Upper and lower quartile (Q) performance scores for the 2-km Run, Medicine Ball Throw (MBT) and Mid-Thigh Pull (MTP) pre- and post-Basic Training (BT) for Army Junior Entry (Army-JE), Army-Standard Entry (Army-SE) and Royal Air Force (RAF). Changes are presented as absolute (Δ) and relative (%Δ) differences (Mean ± SD). *P*-value denotes post-hoc comparison to Quartile 1 (Q1); Army-JE MBT ANOVA was non-significant.

Cohort	Test	Quartile	n	Pre-BT	Post-BT	Absolute Δ	% Δ	*p*	*d*	95% CI
Army-JE	2-km Run (min:s)	Q1	36	10:09 ± 00:47	09:16 ± 00:59	-00:54 ± 00:52	-8.7 ± 8.0			
		Q2	34	08:56 ± 00:09	08:31 ± 00:27	-00:25 ± 00:30	-4.7 ± 5.6	0.035	0.23	[00:45, 01:38]
		Q3	37	08:24 ± 00:09	08:33 ± 00:29	00:08 ± 00:28	1.7 ± 5.7	<0.001	0.52	[00:36, 01:28]
		Q4	32	07:44 ± 00:19	08:02 ± 00:34	00.18 ± 00:27	3.9 ± 5.9	<0.001	0.61	[00:45, 01:38]
	MBT (m)	Q1	31	3.34 ± 0.37	3.64 ± 0.49	0.31 ± 0.28	9.2 ± 8.1			
		Q2	27	3.85 ± 0.07	4.14 ± 0.20	0.28 ± 0.22	7.4 ± 5.6			
		Q3	47	4.12 ± 0.12	4.39 ± 0.26	0.27 ± 0.25	6.5 ± 5.9			
		Q4	36	4.74 ± 0.34	4.96 ± 0.43	0.22 ± 0.36	4.7 ± 7.7			
	MTP (N)	Q1	34	773 ± 126	961 ± 256	203 ± 253	24.4 ± 37.0			
		Q2	35	1051 ± 89	1214 ± 220	148 ± 231	14.4 ± 23.3	0.788	0.08	[-99, 208]
		Q3	34	1307 ± 80	1344 ± 265	39 ± 249	2.9 ± 18.7	0.044	0.40	[3, 324]
		Q4	35	1754 ± 289	1688 ± 278	-69 ± 313	-2.8 ± 15.8	0.001	0.63	[91, 452]
Army-SE	2-km Run (min:s)	Q1	32	10:19 ± 00:36	09:08 ± 00:58	-01:10 ± 00:52	-11.4 ± 8.5			
		Q2	31	09:16 ± 00:13	08:22 ± 00:38	-00:53 ± 00:34	-9.7 ± 6.2	0.419	0.14	[-00:12, 00:46]
		Q3	31	08:38 ± 00:12	08:19 ± 00:47	-00:19 ± 00:48	-3.7 ± 9.3	<0.001	0.36	[00:18, 01:24]
		Q4	32	07:52 ± 00:21	08:18 ± 01:01	00:24 ± 01:10	5.5 ± 15.5	<0.001	0.55	[00:54, 02:16]
	MBT (m)	Q1	30	3.16 ± 0.44	3.46 ± 0.62	0.31 ± 0.34	9.7 ± 10.4			
		Q2	31	4.14 ± 0.16	4.28 ± 0.38	0.15 ± 0.41	3.7 ± 9.8	0.343	0.15	[-0.09, 0.42]
		Q3	36	4.56 ± 0.11	4.55 ± 0.52	-0.01 ± 0.51	-0.2 ± 11.1	0.017	0.26	[0.04, 0.60]
		Q4	35	5.28 ± 0.49	5.14 ± 0.63	-0.14 ± 0.45	-2.6 ± 8.2	<0.001	0.40	[0.19, 0.71]

Cohort	Test	Quartile	n	Pre-BT	Post-BT	Absolute Δ	% Δ	*p*	*d*	95% CI
RAF	MTP (N)	Q1	33	855 ± 141	945 ± 260	90 ± 223	11.0 ± 24.6			
		Q2	32	1227 ± 85	1323 ± 256	98 ± 236	7.9 ± 19.1	>0.05	0.01	[-159, 142]
		Q3	33	1503 ± 90	1466 ± 207	-28 ± 210	-1.7 ± 14.0	0.129	0.19	[-22, 259]
		Q4	34	2032 ± 321	1741 ± 371	-290 ± 321	-13.8 ± 14.2	<0.001	0.49	[202, 558]
	2-km Run (min:s)	Q1	25	09:34 ± 00:36	08:52 ± 00:44	-00:42 ± 00.34	-7.3 ± 6.1			
		Q2	27	08:39 ± 00:08	08:13 ± 00:24	-00:26 ± 00:24	-5.0 ± 4.7	0.235	0.19	[-00:06, 00:38]
		Q3	24	08:12 ± 00:09	07:53 ± 00:18	-00:18 ± 00:23	-3.7 ± 4.7	0.037	0.28	[00:01, 00:46]
		Q4	24	07:32 ± 00:18	07:25 ± 00:20	-00.08 ± 00:13	-1.8 ± 3.0	<0.001	0.45	[00:13, 00:54]
	MBT (m)	Q1	25	3.70 ± 0.40	3.79 ± 0.40	0.09 ± 0.21	2.6 ± 6.2			
		Q2	26	4.37 ± 0.12	4.28 ± 0.22	-0.09 ± 0.24	-2.0 ± 5.4	0.036	0.27	[0.01, 0.34]
		Q3	26	4.75 ± 0.12	4.63 ± 0.29	-0.12 ± 0.29	-2.5 ± 6.1	0.025	0.29	[0.02, 0.40]
		Q4	31	5.44 ± 0.37	5.26 ± 0.43	-0.18 ± 0.28	-3.3 ± 5.0	<0.001	0.39	[0.10, 0.44]
	MTP (N)	Q1	23	900 ± 172	987 ± 236	98 ± 170	12.1 ± 22.2			
		Q2	25	1224 ± 58	1253 ± 207	19 ± 189	1.4 ± 15.0	0.426	0.16	[-59, 218]
		Q3	24	1477 ± 82	1461 ± 172	-11 ± 168	-0.6 ± 11.3	0.136	0.23	[-23, 241]
		Q4	28	1759 ± 162	1636 ± 300	-121 ± 237	-7.0 ± 13.5	0.002	0.38	[67, 371]

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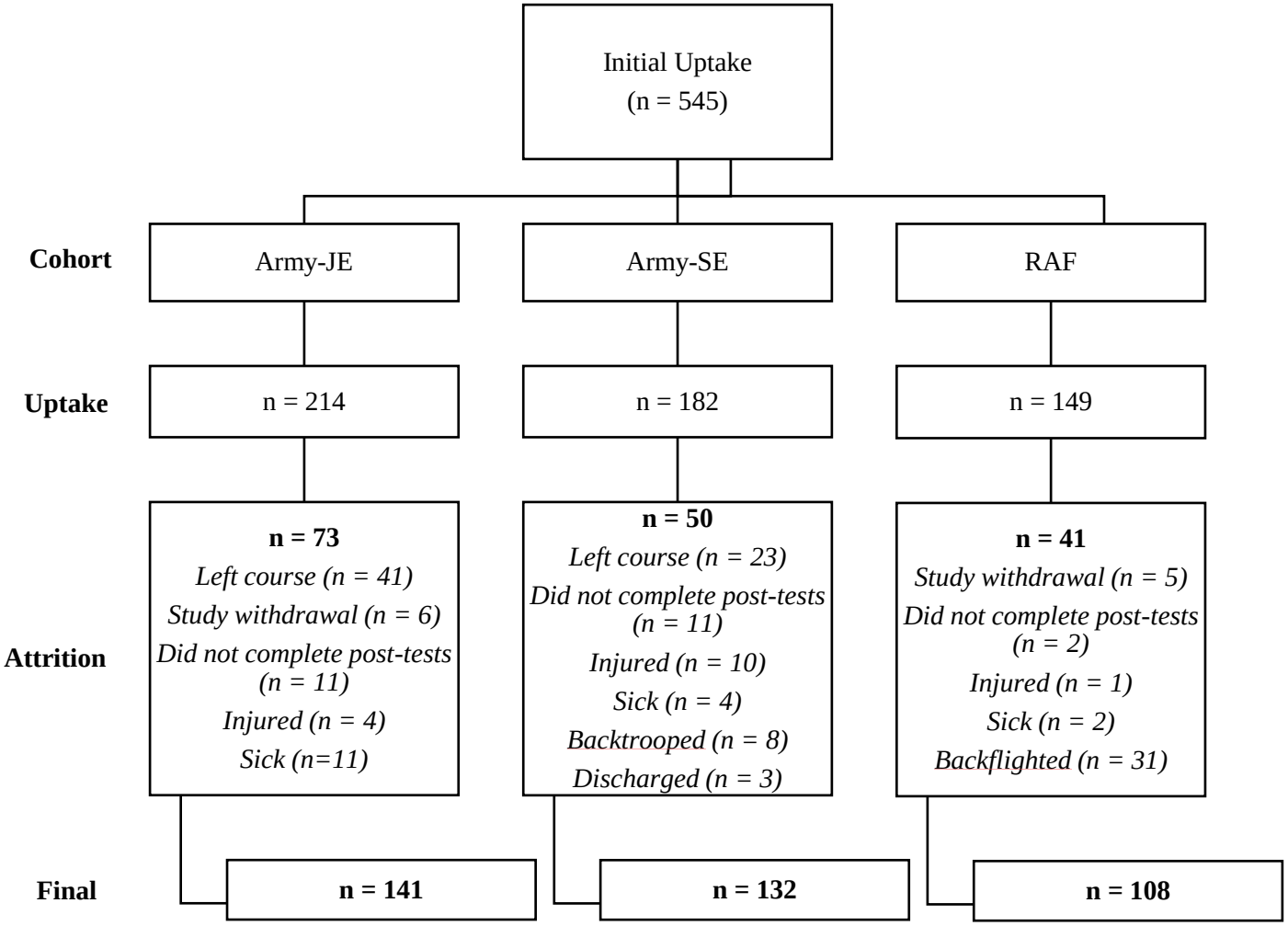

Figure 1 - Flowchart of participant recruitment and dropouts before and during the study.

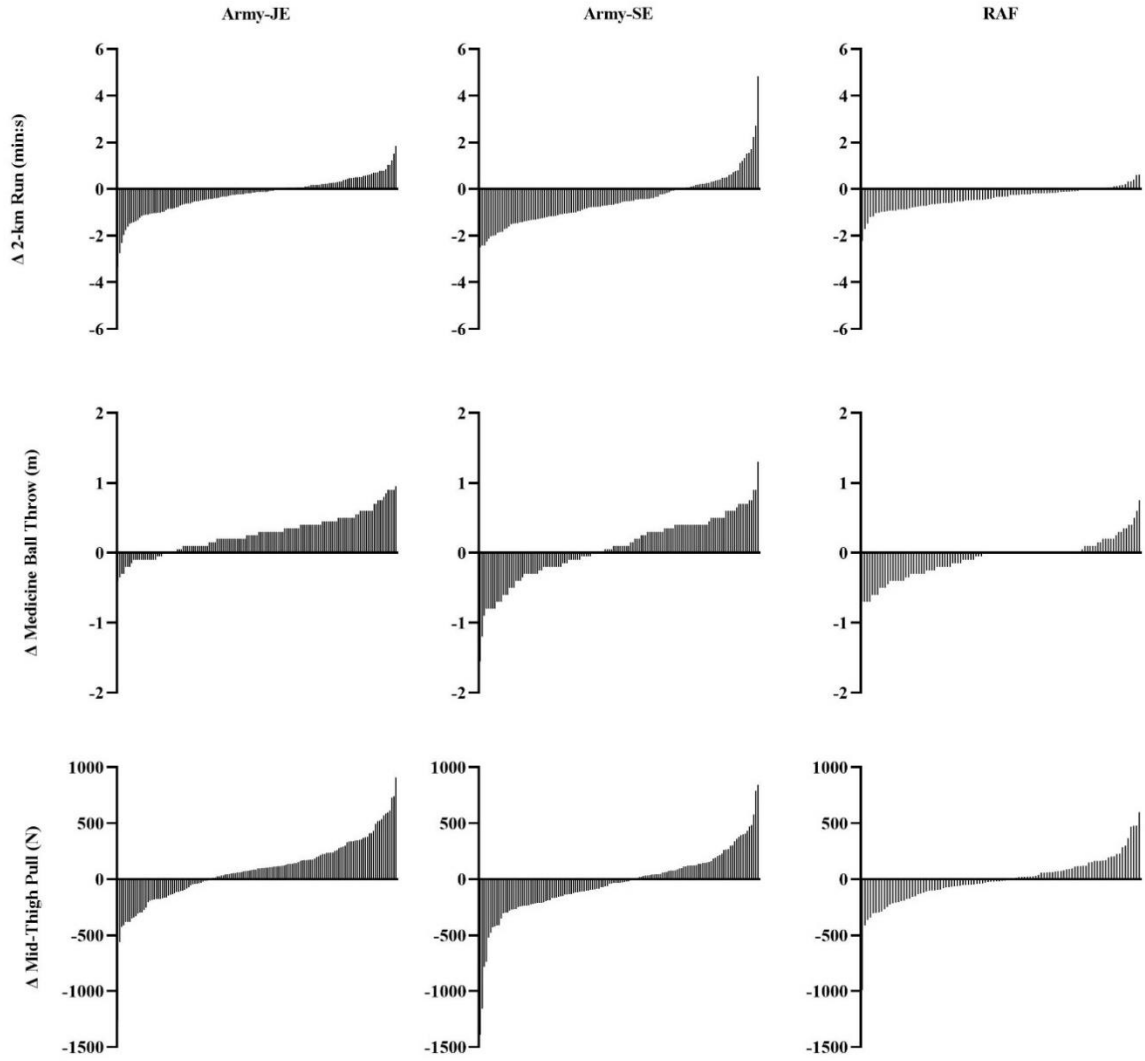

Figure 2 – Absolute changes in performance for individual participants for the 2-km Run, Medicine Ball Throw (MBT), and isometric Mid-thigh Pull (MTP) for British Army Junior Entry (Army-JE), British Army Standard Entry (Army-SE) and Royal Air Force (RAF) Basic Training (BT). Where each vertical line on the graph shows the individual change from pre- to post-BT for a single participant.