Randomised controlled trial comparing two group-based exercise programmes (team sport vs circuit training) on men’s health: study protocol

Henry T Blake,1,2 Brad J Stenner,1,2 Jonathan David Buckley,1,2 Alyson J Crozier1,2

ABSTRACT

Introduction Physical activity promotes physical, psychological and social health. Despite this, almost half of middle-aged (35–54 years) Australian men are insufficiently active. Exercise adherence is increased with social interaction in a group setting. Team sport can leverage the power of groups and has shown to be more intrinsically motivating than discrete exercise modes. Evaluation of the effect of team sport compared with traditional group exercise on health, particularly psychological and social health, and physical activity levels of middle-aged men is limited. This study aims to compare the effects of team sport participation and group circuit training on physical activity levels and health in insufficiently active middle-aged men.

Methods and analysis In this parallel randomised controlled trial, n=128 men aged 35–54 years will complete a 12-week team sport or group circuit exercise programme. Participants must self-report to not be meeting Australian physical activity guidelines or participating in team sport before recruitment. Health-related quality of life, exercise motivation, psychological needs satisfaction, sleep and physical activity levels (accelerometry), blood lipids, glucose and metabolic syndrome risk score will be assessed at baseline, end of the programme and 12 weeks follow-up. Linear mixed effect models will be used.

Ethics and dissemination The study has received ethical approval from the University of South Australia’s Human Research Ethics Committee (Ethics Protocol 203274). Study results will be disseminated via publication in disciplinary-specific journals, conference presentations, and as part of a Doctoral thesis. Trial registration number ANZCTRN12621000483853.

INTRODUCTION

Health is multidimensional, encompassing physical, mental and social well-being, and is more than just the absence of disease or illness.1 The positive influence of physical activity (PA) on health is well established.2 However, participation in PA declines with age,3 and almost half (~46%) of middle-aged Australian men (aged 35–54 years) do not achieve the Australian government’s recommended levels of PA.4 Combined with low levels of PA, middle-aged men also present with elevated levels of worry and stress, low levels of well-being5 and poor social support,6 all of which can contribute to poor overall health. Increasing PA in the middle age can decrease cardiovascular disease-related mortality by 43%7 and improve well-being into older age.3 However, increasing PA in middle-aged men can be difficult due to barriers such as time constraints, competing factors (eg, family), lack of enjoyment, lack of motivation and low confidence levels.8,9

While exercise adherence is multifactorial and complex,10,11 individuals are more likely to adhere when an exercise programme involves an element of social interaction or group work rather than just independent exercise.12,13 Indeed, men have reported a desire for opportunities to exercise with those similar to them and enjoy a level of friendly competition.14 Given the possible benefit of social interaction for improving exercise...
adherence, sport has gained attention as an exercise mode for increasing PA.  

In 2018, WHO released a 12-year global action plan to increase worldwide PA levels, highlighting sport as being underused.

Adults participating in team-based sports have reported greater intrinsic motivation to exercise compared with inactive controls or those participating in other forms of group exercise, including resistance training and spin cycling. Concerning men specifically, Nielsen et al. identified that middle-aged and older men participating in small-sided games reported that enjoyment and social interaction within the game motivated them to adhere to a greater extent than men participating in group-based exercise classes (ie, spin, CrossFit). Among older men with prostate cancer, participating together in recreational soccer was found to generate a sense of collectivity, team spirit and an obligation towards team members to continue to be involved, all of which positively influenced exercise adherence. Taken together, the literature suggests that participation in team sport supports the development of interpersonal relationships, which positively influence motivation to continue to participate with a resultant increase in PA.

The impact of team sport on physiological outcomes and physical health has gained considerable attention, including assessment of impacts of select small-sided team sports, such as recreational soccer, handball, touch-rugby, and basketball on aerobic capacity, blood pressure, and blood lipids. However, evaluations of the impact of team sport participation on participants’ psychological and social well-being, particularly in men in their middle years, has received less attention. Cross-sectional studies have shown that adult recreational sport participation is associated with positive psychological and social health, including mental well-being, life satisfaction, social functioning and improved quality of life, and team sport participation has been associated with better psychosocial outcomes than participation in individual sport. When comparing sport to non-sport exercise, independent of PA levels achieved, men who participated in sport reported superior physical, psychological and social health-related quality of life (HRQoL). However, these findings are based on cross-sectional studies and causation cannot be assumed. This has led to recommendations that causal links between sport participation and psychosocial health be investigated.

Cross-sectional studies have mostly compared team sport with individual sport or individual PA/exercise modalities (eg, running, gymnasium). However, as the existing literature suggests positive contributions of groups on exercise outcomes (ie, improved mental well-being), it raises the question of whether team sport participation, fostering team spirit, enjoyment and social interaction influence health and well-being of men more positively than group-based exercise.

Emerging evidence promotes team sport participation for improving PA adherence (including motivational improvements) and health (as a construct of social, physical and psychological health). However, this has been limited in men in their middle years, with the majority of evidence derived from cross-sectional studies. Further, whether team sport has a differing effect on the health and/or PA levels compared with traditional group-based exercise remains unclear.

This study aims to employ a randomised controlled study design to compare the effect of a team sport intervention with a group exercise intervention on physical and psychological well-being variables in middle-aged men.

DESIGN

A parallel randomised controlled trial will be performed using n=128 insufficiently active middle-aged men (35–54 years) who will participate in one of two 12-week PA interventions: small-sided team sport training, consisting of modified Australian Rules Football, or group circuit exercise. A ‘no-intervention control group’ was not considered necessary because it has already been demonstrated that team sport participation improves physical health and motivation in comparison to inactive controls, and the Australian Government Department of Health recommends that the preferred comparator to assess the efficacy of new health procedure is current practice. HRQoL, motivation to exercise, satisfaction of psychological needs, sleep and PA levels, blood lipids, glucose and metabolic syndrome risk score will be assessed before (baseline), at the end of the 12-week intervention (post-intervention), and after 12 weeks following the completion of the programme (follow-up). An overview of the study timeline is provided in figure 1. A Standard Protocol Items: Recommendations for Interventional Trial Checklist and Template for Intervention Description and Replication Checklist are provided as additional files (see online supplemental file 1 and online supplemental file 2, respectively).

INCLUSION AND EXCLUSION CRITERIA

Participants will be eligible for the study if they meet all of the following criteria: male aged 35–54 years, self-reported to have engaged in less than 150 min of moderate-to-intensity exercise or less than 75 min of vigorous-to-intensity exercise per week over the 6 months leading up to recruitment, able to attend all testing and exercise sessions throughout the intervention and assessed as safe to engage in the exercise programme based on the Exercise and Sports Science Australia Adult Pre-exercise Screening System. Participants will be excluded if they: have a medical condition or injury that restricts them from performing exercise, have experienced a change in medication that might influence outcome measures within 3 months of study commencement, are actively participating in a team sport, do not agree to be randomised to either treatment group, are unwilling or unable to provide written consent, or fail to satisfy the investigator regarding suitability to participate for any other reason.
RECRUITMENT AND SCREENING

Participants will be recruited from the Greater Adelaide Metropolitan Area in South Australia using recruitment flyers, advertisements sent out to the mailing list of a local state league football club or posted on the University of South Australia social media pages, and paid social media advertisements.

Those interested in participating will be provided with an information sheet via a QR code or weblink provided with advertisements or by contacting the researchers directly. Interested participants will then complete an eligibility questionnaire hosted on Research Electronic Data Capture (REDCap) software to determine their suitability to participate. If participants satisfy the eligibility criteria, they will be invited to attend a group familiarisation session.

FAMILIARISATION AND INFORMED CONSENT

The familiarisation session will include one of the researchers (HTB) providing an overview of the study and an opportunity for participants to ask questions. If they wish to participate, they will then complete an informed consent form (see online supplemental file 3). Those who consent will have their height and weight measured, and provided with an opportunity to practice the physical performance test.

RANDOMISATION, ALLOCATION AND BLINDING

Participants will be allocated to treatment via minimisation using the participants HRQoL mental and physical composite scores (collected at baseline), self-reported PA level (collected in eligibility questionnaire), age (collected in eligibility questionnaire) and body mass index (collected at familiarisation visit). Minimisation has the advantage of achieving a balance of outcome measures between groups at baseline in studies with small sample sizes, which is particularly important where there may be strong prognostic factors and modest treatment effects. HTB enrolls participants, and a separate investigator (JDB) who is not directly involved in administering the intervention or data collection will generate the intervention allocations. HTB is not involved in the randomisation process and will be responsible for notifying participants of their group allocation. The nature of the study does not allow blinding of researchers/assessors or participants.

EXERCISE INTERVENTIONS

Participants will be randomised to undertake a 12-week exercise programme involving either team sport or group circuit training. The exercise session durations will be matched across the two groups (60 min per session) and will occur twice weekly. There will be at least 48 hours of recovery between each training session, and all training sessions will occur at the same time of day (ie, in the evenings). Sessions for each treatment will begin and end with a standardised 5–10 min warm-up/cool-down (light aerobic exercise and dynamic movements/stretches) and comprise of a 45 min conditioning phase. A qualified Exercise Scientist will administer all sessions. For participant safety, they will be requested to exercise at a light intensity (11/20 rating of perceived exertion (RPE)) at the start of the training programme before progressing to moderate intensity (14/20 RPE) by week 4. Further progression will be programme-specific, as detailed below. Participants will not be asked to change their PA levels throughout the 12-week programme. Still, they will be advised that they are free to participate in any additional PA they might wish to engage in, as long as the modality is not a team sport nor group-exercise class. Exercise sessions for both groups will be conducted outdoors on a grass oval. If inclement weather occurs, the circuit exercise session will move to a covered area beside the oval, but the team sport activities will remain on the oval.

Team sport intervention

Team sport interventions conducted outside of Australia have used sports popular within their respective geographical regions. Australian Rules Football has the potential to attract sedentary Australian males as it has the strongest loyalty of all sports within Australia and is particularly popular in following and viewing among middle-aged men.
The team sport intervention group will include sessions focused on developing Australian Rules Football skills and sessions in which participants will engage in gameplay. Weeks 1 and 2 will be structured to progressively introduce exercise and movement and develop participants’ capabilities to jog, jump, land, stop and change direction safely. Injuries in similar sport-related interventions occurred during the initial training period, so gradual progression will be used.13 14

Across weeks 3–12, the first weekly session will be a ‘training session’ that progressively builds in physical demand and technical Australian Rules Football skills. This session will incorporate a range of skill-based drills to enable participants to practice the sport’s fundamental skills (eg, kicking, handballing, marking). The second weekly session will involve playing a small-sided version of Australian Rules Football, known as AFL9s. AFL9s features modified rules more appropriate for insufficiently active individuals’ physical capacity and skill level (eg, non-contact, small-sided and two 20 min halves). Where possible, 18 participants will form a training session and be divided each week randomly into two teams to play the AFL9s match. If session attendance is <18, teams will be divided evenly, and the playing field will be adjusted accordingly (eg, 9v 9=100×50 m, 8v 8=90×45 m, 7v 7=80×40 m). An additional file illustrates example sessions for the team sport intervention (see online supplemental file 4).

Group circuit training

Group circuit training was selected as the control condition for this investigation. Circuit training requires individuals to perform exercises, for a set number of repetitions or duration, in a circuit-based fashion with minimal rest between sets.41 Circuit-based training has been previously shown to improve HRQoL,42 aerobic fitness, body composition and cardiometabolic risk factors.41

Exercise sessions will comprise both aerobic and resistance-based exercises. The aerobic exercises will focus on whole-body movements that require minimal equipment. The resistance-based exercises will primarily focus on multi-joint movements following the American College of Sports Medicine Guidelines.43 Each exercise station will last 30 s, with appropriate exercises (eg, squat, push-up) being performed at a 2 s repetition rate to ensure ~15 repetitions are completed per station. Based on the fitness level of the target demographic, 45 s rest intervals between sets will initially be provided before achieving a 30 s rest from week 7 onwards. This is consistent with work:rest ratios and work interval durations that have been shown to improve health and fitness.41 42

From week 7 onwards exercise intensity will be further progressed through adding additional load and exercise modification (eg, supine glute bridge progressing to kettlebell deadlift). The circuit will be completed a total of 3 times with 3.5 min rest between each rotation. Exercises will be altered where necessary to accommodate any physical restrictions that participants may present with. An additional file illustrates example sessions for the circuit training intervention (see online supplemental file 5).

TESTING

Pretesting restrictions

Before testing sessions, participants will be asked to abstain from any strenuous PA for 24 hours, and alcohol and caffeine consumption for 24 hours and 12 hours, respectively. Participants will also fast overnight (10–12 hours) before blood collection.

Questionnaire delivery

All questionnaires will be delivered online through REDCap,35 REDCap is a secure web-based electronic data capture tool hosted by the University of South Australia (REDCap Consortium).

Demographics

Demographic variables will be collected as a part of the baseline questionnaire and include ethnicity, previous sporting history (ie, type, duration, level played), the highest level of education, employment status, annual monetary income, marital status and number and age of dependants.

Primary outcome measure

The primary outcome (change from baseline to post-intervention) will be HRQoL assessed using the Australian version Short Form 36 Health Survey V.2. The 36-item survey assesses eight scales across two dimensions: (1) physical dimension made up of physical functioning, role physical, bodily pain and general health and (2) mental dimension made up of vitality, role emotional, social functioning and mental health.44 This is a widely used measure validated in an Australian population44 45 and has shown good internal consistency across all scales (Cronbach’s α 0.80–0.95).46

Secondary outcome measures

Exercise motivation

The 24-item self-report Behavioural Regulation in Exercise Questionnaire V.3 (BREQ-3) will be used to investigate participants’ motivation to exercise.47 The BREQ-3 assesses six dimensions of motivation of the motivational continuum of self-determination theory. Participants respond to questions using a 5-point Likert scale (0=not true for me, 4=very true for me). The BREQ-3 is internally reliable (Cronbach’s α 0.79–0.89),48 demonstrates adequate test–retest reliability ( >0.78),47 and convergent47 49 50 and criterion48 validity.

Psychological needs

Participants’ psychological needs satisfaction will be assessed using the Psychological Need Satisfaction in Exercise scale (PNSE).51 Meeting one’s needs for autonomy, competence and relatedness influences one’s motivation and positively impacts well-being.52 Participants will
respond to 18 questions assessing the three subscales of autonomy, competence and relatedness satisfaction using a 6-point Likert scale (1=false, 6=true). Each subscale is scored by calculating a mean. The PNSE has good internal reliability (Cronbach’s α 0.95–0.95) in exercising adults and has convergent validity ranging from r=0.32 to 0.65 when compared with the Exercise Motivation Inventory 1 and 2.

PA and sleep
PA will be assessed using a wrist-worn triaxial accelerometer (Axivity AX3, Axivity, Newcastle, UK). The Axivity AX3 device has shown to be valid in laboratory conditions as well as in capturing the PA of older adults. Participants will wear the wrist-worn device for seven consecutive days on their non-dominant wrist and be asked to complete a daily activity log capturing the time they went to bed and woke, whether they napped and whether they took the device off (including when and why). Raw data (as 60 s epochs) will be extracted using the open-source OMQ GUI Configuration and Analysis Tool (Axivity, Newcastle, UK). These data will then be imported into custom software (Cobra, developed at the University of South Australia, Adelaide, Australia) through MATLAB R2019a (MathWorks, Natick, Massachusetts, USA). This software will separate data into wear, non-wear and sleep time using the activity log, after which periods of sedentary time, low and moderate/vigorous PA will be determined using predefined thresholds.

Anthropometric and resting measurements
The following measures will be collected according to the method outlined by Coombes and Williams. Participant weight will be collected to the nearest 0.1 kg using an electronic scale (Tanita Ultimate Scale, Tanita, Tokyo, Japan) and height to the nearest 0.5 cm using a portable stadiometer (Seca, Hamburg, Germany). Waist circumference will be measured halfway between the inferior border of the 10th costal and the superior border of the iliac crest. Blood pressure will be measured manually in the left arm following at least a 5 min rest in a seated position. The average of two measurements separated by 30 s will be used. If the two measures differ by more than 10 mm Hg systolic or 6 mm Hg diastolic, a third reading will be taken after a 5 min rest, and the average of the two closest readings will be taken.

Blood profile and metabolic risk
Following an overnight fast (10–12 h), a capillary blood sample will be collected from the fingertip and analysed using an automated analyser (Cholestech LDX System, Alere, Waltham, Massachusetts, USA). Measurements of blood glucose, total cholesterol, triglycerides, high-density lipoprotein cholesterol will be obtained and low-density lipoprotein cholesterol will be estimated within the Cholestech LDX System using the Friedewald equation. The Cholestech LDX System is accurate and has good reproducibility. A Metabolic Syndrome Risk Score will be calculated for each participant according to the method of Gurka et al.

Cardiorespiratory fitness
To assess cardiorespiratory fitness, the Yo-Yo Intermittent Endurance level 1 test will be performed during the first session of week 1 and post-programme. This test has been shown to detect changes in physical capacity in untrained men. The test involves participants completing 2 × 20 m runs (ie, one shuttle) of incrementally increasing speed, interspersed with a 5 s recovery period (2 × 2.5 m). The test will be terminated once the participant fails to complete more than one shuttle in the allocated time or reaches volitional exhaustion. The test will be performed outdoors on a grass oval after a 10 min warm-up. Performance will be defined as the total distance covered during the test.

Intervention adherence
Participant adherence to the exercise interventions will be assessed by monitoring session attendance. Reasons for non-participation will be collected from participants.

Session training loads
To assess the internal load of the exercise programmes, participants will be fitted with a Polar M400 heart rate monitor (Polar Electro Oy, Kempele, Finland) during their exercise sessions in weeks 3, 7 and 11. Average heart rate, peak heart rate and Edward’s training impulse will be quantified. Subjective session intensity will also be assessed using the RPE Category Ratio scale (CR-10 scale) across weeks 3–12.

DATA MANAGEMENT AND CONFIDENTIALITY
Each participant will be allocated an ID number. All data will be coded with that number and stored on a password-protected Excel document (Microsoft, New York, USA), with access only granted to project investigators. Hard copy data will be stored in a locked filing cabinet in a secure room at the University of South Australia. Data obtained through REDCap will be backed up on the University of South Australia’s secure REDCap data management system on a password-protected server.

STATISTICAL ANALYSIS
Justification of sample size
The sample size required for this study is based on identifying a difference in HRQoL between treatment groups with a medium effect size (ie, 0.5). This magnitude of effect size is considered meaningful for HRQoL. Identifying this effect size at an alpha level of 0.05 with 80% power will require 128 participants (64 per treatment group) to complete the protocol. To account for a potential dropout of 10%, a total of 140 participants will be required. Given the sample size, the intervention is planned to run across two waves. The participant uptake during the recruitment phases will influence the specific size of the waves.
Data analysis

All data will be presented as mean±SD. Data analysis will be performed using Stata/IC V.15 (StataCorp). Independent samples t-tests will be used to compare participant characteristics between groups at baseline. A linear mixed-effect model will be used to assess the effects of the independent variable (team sport or circuit training) on the dependent measures. Outcome measures, treatment allocation and time will be entered as fixed effects, and participant ID entered as a random effect. If participants withdraw from the study, their available data will be included in an intention to treat analysis. A sensitivity analysis will also be performed using data only from participants who attended at least 70% of training sessions. Statistical significance will be set at an alpha level of 0.05. Preliminary data analysis will be conducted following the completion of the first study wave to confirm the proposed sample size.

PATIENT AND PUBLIC INVOLVEMENT

There was no patient or public involvement in the design of this study.

DISCUSSION

This protocol paper describes the methodology used to assess how a team sport programme influences the PA levels and health of insufficiently active men aged 35–54 years, compared with a group circuit condition. Despite cross-sectional evidence that shows that team sport participation improves a range of psychological and social health markers, cross-sectional data do not provide evidence of causation. This study will use a randomised controlled trial design to provide evidence of the causative effects of team sport participation on health (physical, psychological, social). Therefore, the findings of this study will, therefore, provide robust insight into the utility of team sport for improving the health of men through their middle years. The findings may inform the development of policy around the promotion of sport for health in this demographic.

ETHICS AND DISSEMINATION

This study has been approved by the University of South Australia’s Human Research Ethics Committee (Ethics Protocol 203274). Research participants will be informed of any approved protocol amendments and the trial registry will be updated. Study results will be disseminated through publication in disciplinary-specific journals, conference presentations and will form a portion of a Doctoral thesis. Individuals who have contributed to the design and implementation of the protocol will be eligible to be included in publications.

ADVERSE EVENT

All investigators and primary staff involved in the delivery of the study are trained on the appropriate response to adverse events. HTB will report adverse events to the University of South Australia Human Research Ethics Committee. An adverse event is defined as any untoward medical occurrence that requires treatment and which does not necessarily have a causal relationship with this intervention.

INTERVENTION AND DATA MONITORING

To avoid bias in programme delivery, the principal investigator (HTB) will not deliver the 12-week programmes but will attend selected sessions to monitor appropriate delivery. Qualified Exercise Scientists, with a background in Australian Rules Football, will deliver the interventions. HTB will collect the outcome measure data and meet weekly with the research team to review study progress.

Contributors

HTB, JDB, AJC and BS designed the study. HTB is a PhD Candidate at the University of South Australia and JDB, AJC and BS are employed by the University of South Australia. JB secured the funding for the study. HTB prepared the manuscript which was reviewed by all authors.

Funding

This study is funded by a grant provided by the Norwood Football Club, South Australia, Australia. No affiliates of the funding organisation had direct influence on the methods, data collection, or data analysis and reporting relating to this study. HTB is supported by an Australian Government Research Training Program Scholarship and a top-up scholarship from the grant provided by the Norwood Football Club.

Competing interests

AJC, BS and JDB are employees of the University of South Australia which received a grant to support this study.

Patient and public involvement

Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

Patient consent for publication

Not required.

Provenance and peer review

Not commissioned; externally peer reviewed.

Data availability statement

The datasets generated and/or analysed during the current study are not publicly available due to participant privacy but are available from the corresponding author on reasonable request.

Open access

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REFERENCES


SPIRIT 2013 Checklist: Recommended items to address in a clinical trial protocol and related documents*

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<td>Date and version identifier</td>
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<td>4</td>
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<td>20</td>
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<td>Names, affiliations, and roles of protocol contributors</td>
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<td>Name and contact information for the trial sponsor</td>
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### Composition, roles, and responsibilities of the coordinating centre, steering committee, endpoint adjudication committee, data management team, and other individuals or groups overseeing the trial, if applicable (see Item 21a for data monitoring committee)

**5d**

### Introduction

**Background and rationale**

6a Description of research question and justification for undertaking the trial, including summary of relevant studies (published and unpublished) examining benefits and harms for each intervention

4-6

6b Explanation for choice of comparators

4-7 and 9-12

### Objectives

7 Specific objectives or hypotheses

6-7

### Trial design

8 Description of trial design including type of trial (eg, parallel group, crossover, factorial, single group), allocation ratio, and framework (eg, superiority, equivalence, noninferiority, exploratory)

6-7

### Methods: Participants, interventions, and outcomes

**Study setting**

9 Description of study settings (eg, community clinic, academic hospital) and list of countries where data will be collected. Reference to where list of study sites can be obtained

8 and 10

**Eligibility criteria**

10 Inclusion and exclusion criteria for participants. If applicable, eligibility criteria for study centres and individuals who will perform the interventions (eg, surgeons, psychotherapists)

7-8

**Interventions**

11a Interventions for each group with sufficient detail to allow replication, including how and when they will be administered

9-12 (Additional file 3 and 4)

11b Criteria for discontinuing or modifying allocated interventions for a given trial participant (eg, drug dose change in response to harms, participant request, or improving/worsening disease)

9-12

11c Strategies to improve adherence to intervention protocols, and any procedures for monitoring adherence (eg, drug tablet return, laboratory tests)

16

11d Relevant concomitant care and interventions that are permitted or prohibited during the trial

10
<table>
<thead>
<tr>
<th>Category</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outcomes</td>
<td>12</td>
</tr>
<tr>
<td>Participant timeline</td>
<td>13</td>
</tr>
<tr>
<td>Sample size</td>
<td>14</td>
</tr>
<tr>
<td>Recruitment</td>
<td>15</td>
</tr>
<tr>
<td>Methods: Assignment of ...</td>
<td>16a</td>
</tr>
<tr>
<td>Allocation:</td>
<td></td>
</tr>
<tr>
<td>Sequence generation</td>
<td>16b</td>
</tr>
<tr>
<td>Allocation concealment mechanism</td>
<td>16c</td>
</tr>
<tr>
<td>Implementation</td>
<td></td>
</tr>
<tr>
<td>Blinding (masking)</td>
<td>17a</td>
</tr>
<tr>
<td>Methods: Data collection, management, and analysis</td>
<td>17b</td>
</tr>
</tbody>
</table>

**Outcomes**

Primary, secondary, and other outcomes, including the specific measurement variable (eg, systolic blood pressure), analysis metric (eg, change from baseline, final value, time to event), method of aggregation (eg, median, proportion), and time point for each outcome. Explanation of the clinical relevance of chosen efficacy and harm outcomes is strongly recommended.

**Participant timeline**

Time schedule of enrolment, interventions (including any run-ins and washouts), assessments, and visits for participants. A schematic diagram is highly recommended (see Figure).

**Sample size**

Estimated number of participants needed to achieve study objectives and how it was determined, including clinical and statistical assumptions supporting any sample size calculations.

**Recruitment**

Strategies for achieving adequate participant enrolment to reach target sample size.

**Methods: Assignment of interventions (for controlled trials)**

**Allocation:**

<table>
<thead>
<tr>
<th>Method</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sequence generation</td>
<td>16a</td>
</tr>
<tr>
<td>Allocation concealment mechanism</td>
<td>16b</td>
</tr>
<tr>
<td>Implementation</td>
<td>16c</td>
</tr>
<tr>
<td>Blinding (masking)</td>
<td>17a</td>
</tr>
</tbody>
</table>

**Methods: Data collection, management, and analysis**
Data collection methods

18a Plans for assessment and collection of outcome, baseline, and other trial data, including any related processes to promote data quality (e.g., duplicate measurements, training of assessors) and a description of study instruments (e.g., questionnaires, laboratory tests) along with their reliability and validity, if known. Reference to where data collection forms can be found, if not in the protocol.

18b Plans to promote participant retention and complete follow-up, including list of any outcome data to be collected for participants who discontinue or deviate from intervention protocols.

Data management

19 Plans for data entry, coding, security, and storage, including any related processes to promote data quality (e.g., double data entry; range checks for data values). Reference to where details of data management procedures can be found, if not in the protocol.

Statistical methods

20a Statistical methods for analysing primary and secondary outcomes. Reference to where other details of the statistical analysis plan can be found, if not in the protocol.

20b Methods for any additional analyses (e.g., subgroup and adjusted analyses).

20c Definition of analysis population relating to protocol non-adherence (e.g., as randomised analysis), and any statistical methods to handle missing data (e.g., multiple imputation).

Methods: Monitoring

Data monitoring

21a Composition of data monitoring committee (DMC); summary of its role and reporting structure; statement of whether it is independent from the sponsor and competing interests; and reference to where further details about its charter can be found, if not in the protocol. Alternatively, an explanation of why a DMC is not needed.

21b Description of any interim analyses and stopping guidelines, including who will have access to these interim results and make the final decision to terminate the trial.

Harms

22 Plans for collecting, assessing, reporting, and managing solicited and spontaneously reported adverse events and other unintended effects of trial interventions or trial conduct.

Auditing

23 Frequency and procedures for auditing trial conduct, if any, and whether the process will be independent from investigators and the sponsor.

Ethics and dissemination
<table>
<thead>
<tr>
<th>Topic</th>
<th>Page(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research ethics approval</td>
<td>24</td>
</tr>
<tr>
<td>Protocol amendments</td>
<td>25</td>
</tr>
<tr>
<td>Consent or assent</td>
<td>26a</td>
</tr>
<tr>
<td></td>
<td>26b</td>
</tr>
<tr>
<td>Confidentiality</td>
<td>27</td>
</tr>
<tr>
<td>Declaration of interests</td>
<td>28</td>
</tr>
<tr>
<td>Access to data</td>
<td>29</td>
</tr>
<tr>
<td>Ancillary and post-trial care</td>
<td>30</td>
</tr>
<tr>
<td>Dissemination policy</td>
<td>31a</td>
</tr>
<tr>
<td></td>
<td>31b</td>
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<tr>
<td></td>
<td>31c</td>
</tr>
<tr>
<td>Appendices</td>
<td></td>
</tr>
<tr>
<td>Informed consent materials</td>
<td>32</td>
</tr>
</tbody>
</table>

**Notes:**
- Plans for seeking research ethics committee/institutional review board (REC/IRB) approval
- Plans for communicating important protocol modifications (e.g., changes to eligibility criteria, outcomes, analyses) to relevant parties (e.g., investigators, REC/IRBs, trial participants, trial registries, journals, regulators)
- Who will obtain informed consent or assent from potential trial participants or authorised surrogates, and how (see Item 32)
- Additional consent provisions for collection and use of participant data and biological specimens in ancillary studies, if applicable
- How personal information about potential and enrolled participants will be collected, shared, and maintained in order to protect confidentiality before, during, and after the trial
- Financial and other competing interests for principal investigators for the overall trial and each study site
- Statement of who will have access to the final trial dataset, and disclosure of contractual agreements that limit such access for investigators
- Provisions, if any, for ancillary and post-trial care, and for compensation to those who suffer harm from trial participation
- Plans for investigators and sponsor to communicate trial results to participants, healthcare professionals, the public, and other relevant groups (e.g., via publication, reporting in results databases, or other data sharing arrangements), including any publication restrictions
- Authorship eligibility guidelines and any intended use of professional writers
- Plans, if any, for granting public access to the full protocol, participant-level dataset, and statistical code
- Model consent form and other related documentation given to participants and authorised surrogates

Supplemental material

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| Biological specimens | 33 | Plans for collection, laboratory evaluation, and storage of biological specimens for genetic or molecular analysis in the current trial and for future use in ancillary studies, if applicable | N/A |

*It is strongly recommended that this checklist be read in conjunction with the SPIRIT 2013 Explanation & Elaboration for important clarification on the items. Amendments to the protocol should be tracked and dated. The SPIRIT checklist is copyrighted by the SPIRIT Group under the Creative Commons "Attribution-NonCommercial-NoDerivs 3.0 Unported" license.*
The TIDieR (Template for Intervention Description and Replication) Checklist*:

Information to include when describing an intervention and the location of the information

<table>
<thead>
<tr>
<th>Item number</th>
<th>Item</th>
<th>Where located **</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>BRIEF NAME</strong></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Provide the name or a phrase that describes the intervention.</td>
<td>Pg. 6</td>
</tr>
<tr>
<td></td>
<td><strong>WHY</strong></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Describe any rationale, theory, or goal of the elements essential to the intervention.</td>
<td>Pg. 4-6, 9-11, Additional file 4 and 5</td>
</tr>
<tr>
<td></td>
<td><strong>WHAT</strong></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Materials: Describe any physical or informational materials used in the intervention, including those provided to participants or used in intervention delivery or in training of intervention providers.</td>
<td>Additional file 4 and 5</td>
</tr>
<tr>
<td></td>
<td>Provide information on where the materials can be accessed (e.g. online appendix, URL).</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Procedures: Describe each of the procedures, activities, and/or processes used in the intervention, including any enabling or support activities.</td>
<td>Pg. 9-12, Additional file 4 and 5</td>
</tr>
<tr>
<td></td>
<td><strong>WHO PROVIDED</strong></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>For each category of intervention provider (e.g. psychologist, nursing assistant), describe their expertise, background and any specific training given.</td>
<td>Pg. 9</td>
</tr>
<tr>
<td></td>
<td><strong>HOW</strong></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Describe the modes of delivery (e.g. face-to-face or by some other mechanism, such as internet or telephone) of the intervention and whether it was provided individually or in a group.</td>
<td>Pg. 9-10</td>
</tr>
<tr>
<td></td>
<td><strong>WHERE</strong></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Describe the type(s) of location(s) where the intervention occurred, including any necessary infrastructure or relevant features.</td>
<td>Pg. 10</td>
</tr>
</tbody>
</table>

TIDieR checklist
<table>
<thead>
<tr>
<th>WHEN and HOW MUCH</th>
<th>Pg. 9</th>
</tr>
</thead>
<tbody>
<tr>
<td>8. Describe the number of times the intervention was</td>
<td></td>
</tr>
<tr>
<td>delivered and over what period of time including the</td>
<td></td>
</tr>
<tr>
<td>number of sessions, their schedule, and their duration,</td>
<td></td>
</tr>
<tr>
<td>intensity or dose.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TAILORING</th>
<th>Pg. 12</th>
</tr>
</thead>
<tbody>
<tr>
<td>9. If the intervention was planned to be personalised,</td>
<td></td>
</tr>
<tr>
<td>titrated or adapted, then describe what, why, when,</td>
<td></td>
</tr>
<tr>
<td>and how.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MODIFICATIONS</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.* If the intervention was modified during the course</td>
<td></td>
</tr>
<tr>
<td>of the study, describe the changes (what, why, when,</td>
<td></td>
</tr>
<tr>
<td>and how).</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>HOW WELL</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>11. Planned: If intervention adherence or fidelity was</td>
<td></td>
</tr>
<tr>
<td>assessed, describe how and by whom, and if any</td>
<td></td>
</tr>
<tr>
<td>strategies were used to maintain or improve fidelity,</td>
<td></td>
</tr>
<tr>
<td>describe them.</td>
<td></td>
</tr>
<tr>
<td>12.* Actual: If intervention adherence or fidelity was</td>
<td></td>
</tr>
<tr>
<td>assessed, describe the extent to which the intervention</td>
<td></td>
</tr>
<tr>
<td>was delivered as planned.</td>
<td></td>
</tr>
</tbody>
</table>

** Authors - use N/A if an item is not applicable for the intervention being described. Reviewers – use ‘?’ if information about the element is not reported/not sufficiently reported.

† If the information is not provided in the primary paper, give details of where this information is available. This may include locations such as a published protocol or other published papers (provide citation details) or a website (provide the URL).

‡ If completing the TIDieR checklist for a protocol, these items are not relevant to the protocol and cannot be described until the study is complete.

* We strongly recommend using this checklist in conjunction with the TIDieR guide (see BMJ 2014;348:g1687) which contains an explanation and elaboration for each item.

* The focus of TIDieR is on reporting details of the intervention elements (and where relevant, comparison elements) of a study. Other elements and methodological features of studies are covered by other reporting statements and checklists and have not been duplicated as part of the TIDieR checklist. When a randomised trial is being reported, the TIDieR checklist should be used in conjunction with the CONSORT statement (see www.consort-statement.org) as an extension of Item 5 of the CONSORT 2010 Statement. When a clinical trial protocol is being reported, the TIDieR checklist should be used in conjunction with the SPIRIT statement as an extension of Item 11 of the SPIRIT 2013 Statement (see www.spirit-statement.org). For alternate study designs, TIDieR can be used in conjunction with the appropriate checklist for that study design (see www.equator-network.org).
PROJECT CONSENT FORM

*Project Title:* A comparison of two group-based exercise programs (team-sport vs. circuit training) on men’s health.

*Researchers:*  
Mr. Henry Blake: email: blaht001@mymail.unisa.edu.au  
Professor. Jon Buckley: Ph: 8302 1853; email: Jon.Buckley@unisa.edu.au  
Dr. Alyson Crozier: Ph: 8302 2094; email: Alyson.Crozier@unisa.edu.au  
Dr. Brad Stenner: Ph: 8302 1424; email: Brad.Stenner@unisa.edu.au

This project has been approved by the University of South Australia’s Human Research Ethics Committee (Ethics Protocol 203274). If you have any ethical concerns about the project or questions about your rights as a participant please contact the Executive Officer of this Committee, Tel: +61 8 8302 6330; Email: humanethics@unisa.edu.au

In signing this form, I confirm that:

- I have read the Participant Information Sheet and the nature and purpose of the research project has been explained to me. I understand and agree to take part.
- I understand the purpose of the research project and my involvement in it; and that prior to participating in the study I may be asked to explain in my own words my understanding of my involvement.
- I understand that I may withdraw from the research project at any stage and that this will not affect my status now or in the future.
- I understand that if I withdraw from the study, I may request that data collected from me be withdrawn from the study up until two weeks after withdrawing.
- I understand that if I withdraw from the study prior to its completion, my data may still be used.
- I understand that while information gained during the study may be published, I will not be identified and my personal results will remain confidential, unless required by law.
- I understand and agree to being randomised to either of the two exercise programs detailed within the Participant Information Sheet.
- I understand that all data will be allocated a participant ID number and stored on the University campus on password protected computers and in secure storage during the study. Following the publication of results, data will be housed in a secure off-site storage facility run by the University and will be destroyed after 5 years.
- I give consent to be contacted for future studies that I may be suitable for: Yes ☐ No ☐

**Name of participant**  
…………………………………………………………………………………………………………………………………………

**Signed**  ………………………………………………… **Date**  ……………………………………………………………

**Witness**  
I have provided  …………………………………………………………………………………………………………………… (Name of participant) information about the research and believe that he/she understands what is involved.

**Researcher’s Name**  …………………………………………………………………………………………………………………

**Researcher’s signature**  ………………………………………………… **Date**  ………………………………………

**Role in the project**  …………………………………………………………………………………………………………………

1
A randomised-controlled trial comparing two group-based exercise programs (team-sport vs. circuit training) on men’s health – study protocol.

Additional File 2 – Two example sessions from the 12-week team sport program

Image 1 and 2 depict the 2nd session of week #2. The warm-up found in image #1 depicts the standardised warm-up that participants undertake at the beginning of each session throughout the 12-week program. This is the final session of the initial two weeks that focus on re-introducing participants to movement. There is a large emphasis on whole-body movements and on body control/balance (e.g. single leg squat and cone pick-ups). Within this specific example session, movements that will be used within the soon to come games are introduced (e.g. jump and landing technique during a ball up and collecting the ball from the ground will jogging).

Image 3, 4 and 5 depict the 1st session of week #4. This is the second session for the program that is focused on teaching participants the fundamental skills of Australian Rules Football. This session specifically incorporates drills to teach participants kicking and handballing and at a moderate intensity. From week #3 to #12 of the 12-week program, this example session represents the structure of the 1st weekly session, while the 2nd weekly session involves playing a game AFL9s. The drills throughout the weeks progress in skill technical difficulty and physicality.

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A randomised-controlled trial comparing two group-based exercise programs (team-sport vs. circuit training) on men’s health – study protocol.

Mr. Henry Blake – Alliance for Research in Exercise, Nutrition and Activity (ARENA), UniSA Allied Health and Human Performance, University of South Australia

**Weekly focus:**
- Continue practising and familiarising with fundamental movement patterns
- Integrate ball handling into movements
- Ensure participants familiar with all tools and the upcoming sessions

**Equipment:**
- Resistance bands
- Cones
- Light kit

**Warm Up (10-minutes):**
- Progressive increase from RPE 8 to 11
  - Aerobic
    - Walk 200m (half speed), jog (RPE 10) 100m
  - Dynamic
    - 1a: 10 x 8m squats – slow controlled
    - 1b: 10 x band pull apart - retract shoulder blades, slight bend in elbow
    - 2a: 10 x glute bridges – squeeze glutes at top
    - 2b: 8 x laying posterior pelvic tilts (flattens back) – very slow controlled movement

**AF Exercises (45-minutes) RPE = 12:**
- Strength + movement technique
- Balance and neuromotor
- Functional performance

**Cool Down (5-minutes):**
- Static stretching

**Exercises and activities**

**Field Set-up – conduct training within playing field (to familiarise players with the space for future games/skills case comes to set-up field as shown below)**

**Physical Training:**
- Strength + technique: arranged in circuit
  - 1a: Light kit or Sandbag Squat
  - 1b: Glute bridge w/ ball squeeze
  - 1c: Partnered single leg (shabbage squat) x 6 a/s (above exercises based on timing of this one)
  - Repeat above x 2

**Balance and neuromotor:**
- Ball up jump and holds x 4
  - 4 people in a group, 2 going for the jump and one either side of the jump to collect (capped) ball. Practice 4 times and swap roles
  - Repeated jumps and landing learnt in previous week in game based context (jump ball)
- Cone pick-ups
  - Drilling short movements with cone pickup and place back down (left to right and back)
  - Ensure neutral spine, bend from hips, knee controlled on stance leg
  - Repeat above x 2

**Functional Performance:**
- Submaximal, run w/ ground ball collection
  - Ball on ground at the mark and run through another line following collection
  - Teaching skills rebounding and ball collection within the body is moving

To finish, outline of basic rules of the AF games to begin in the following week
A randomised-controlled trial comparing two group-based exercise programs (team-sport vs. circuit training) on men’s health – study protocol.

Mr. Henry Blake – Alliance for Research in Exercise, Nutrition and Activity (ARENA), UniSA Allied Health and Human Performance, University of South Australia
A randomised-controlled trial comparing two group-based exercise programs (team-sport vs. circuit training) on men’s health – study protocol.

Additional File 3 – Three example sessions from the 12-week circuit training program

**Overall session structure**
Within each session, exercise selection and order were purposeful. Sessions were designed to include at least:
- 2 resistance stations with movements utilising the whole body
- 2 resistance stations targeting the upper body (1 push and 1 pull movement)
- 2 resistance stations targeting the lower body (1 push and 1 pull movement)
- 2 aerobic stations with movements that were easily progressed or regressed and required minimal to no equipment
- 1 resistance station with a focus on core muscular control

The sequencing of the stations was done in a way to avoid the same body area being worked sequentially, while stations that were not expected to raise heart rate significantly were situated following higher intensity stations (e.g. core muscular control following the aerobic station).

**Program progression**
Table 1 depicts an overview of the session structure. As can be seen, mirroring that of the team-sport group, session intensity is initially increased through progressing the prescribed rating of perceived exertion (RPE). From week 5 onwards, participants were instructed to exercise at an intensity that they felt challenging but that they felt comfortable with (as is done in the team-sport group). Further progression is achieved in weeks 5 to 6 through reducing the rest interval, while also incorporating two more exercising stations to maintain similar total session duration. The final change in rest interval occurs from week 7 and is held throughout the remainder of the program. From week 7 an additional station is also added to combat the decreased rest interval, to maintain session duration. Exercises are progressed in difficulty throughout the program.

**Example sessions**
Table 2, 3 and 4 are example sessions from the program.

### Table 1 – overview of 12-week circuit training program

<table>
<thead>
<tr>
<th>Week</th>
<th>Repetitions</th>
<th>Rest</th>
<th>Intensity</th>
<th>Number of stations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 – 4</td>
<td>30 seconds</td>
<td>45 seconds</td>
<td>Wk 1 RPE 11</td>
<td>9 (as outlined above)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Wk 2 RPE 12</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Wk 3 RPE 13</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Wk 4 RPE 14</td>
<td></td>
</tr>
<tr>
<td>5 – 6</td>
<td>30 seconds</td>
<td>35 seconds</td>
<td>RPE 14+</td>
<td>12 (above + 1 x whole body, aerobic, and core station)</td>
</tr>
<tr>
<td>7 – 12</td>
<td>30 seconds</td>
<td>30 seconds</td>
<td>RPE 14+</td>
<td>13 (above + 1 core station)</td>
</tr>
</tbody>
</table>

RPE; rating of perceived exertion (6-20 scale).

### Table 2 – example session – week #2 (note rest interval and intensity)

<table>
<thead>
<tr>
<th>Type</th>
<th>Exercise</th>
<th>Reps</th>
<th>Rest</th>
<th>Intensity</th>
<th>Equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>WB</td>
<td>Battle ropes</td>
<td>30s</td>
<td>45s</td>
<td>12</td>
<td>Battle Rope</td>
</tr>
<tr>
<td>LB</td>
<td>Lunge (stationary)</td>
<td>30s</td>
<td>45s</td>
<td>12</td>
<td>Kettlebell</td>
</tr>
<tr>
<td>UB</td>
<td>Upright row</td>
<td>30s</td>
<td>45s</td>
<td>12</td>
<td>Sandbag or Kettlebell</td>
</tr>
<tr>
<td>AT</td>
<td>High knees</td>
<td>30s</td>
<td>45s</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Core</td>
<td>Deadbug</td>
<td>30s</td>
<td>45s</td>
<td>12</td>
<td>Mat</td>
</tr>
<tr>
<td>WB</td>
<td>Weighted slow walk</td>
<td>30s</td>
<td>45s</td>
<td>12</td>
<td>Sandbag</td>
</tr>
<tr>
<td>LB</td>
<td>Good Morning</td>
<td>30s</td>
<td>45s</td>
<td>12</td>
<td>Sandbag or Kettlebell</td>
</tr>
<tr>
<td>AT</td>
<td>Light jog</td>
<td>30s</td>
<td>45s</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>UB</td>
<td>2 Hand Banded Press</td>
<td>30s</td>
<td>45s</td>
<td>12</td>
<td>Resistance Band</td>
</tr>
</tbody>
</table>

Repeat 3 times (3.5 min rest between sets)

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A randomised-controlled trial comparing two group-based exercise programs (team-sport vs. circuit training) on men’s health – study protocol.

Table 3 – example session – week 6 (note rest interval decrease, change in RPE intensity and additional stations)

<table>
<thead>
<tr>
<th>Type</th>
<th>Exercise</th>
<th>Reps</th>
<th>Rest</th>
<th>Intensity</th>
<th>Equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>WB</td>
<td>Rope pull</td>
<td>30s</td>
<td>35s</td>
<td>14+</td>
<td>Battle Rope</td>
</tr>
<tr>
<td>LB</td>
<td>Stationary lunge</td>
<td>30s</td>
<td>35s</td>
<td>14+</td>
<td>Sandbag or Kettlebell</td>
</tr>
<tr>
<td>UB</td>
<td>Split Squat banded row</td>
<td>30s</td>
<td>35s</td>
<td>14+</td>
<td>Heavy resistance band</td>
</tr>
<tr>
<td>AT</td>
<td>High Knees</td>
<td>30s</td>
<td>35s</td>
<td>14+</td>
<td></td>
</tr>
<tr>
<td>Core</td>
<td>Banded wood chop</td>
<td>30s</td>
<td>35s</td>
<td>14+</td>
<td>Resistance band</td>
</tr>
<tr>
<td>WB</td>
<td>Suitcase carry</td>
<td>30s</td>
<td>35s</td>
<td>14+</td>
<td>Sandbag</td>
</tr>
<tr>
<td>LB</td>
<td>Deadlift</td>
<td>30s</td>
<td>35s</td>
<td>14+</td>
<td>Kettlebell</td>
</tr>
<tr>
<td>AT</td>
<td>10m shuttles</td>
<td>30s</td>
<td>35s</td>
<td>14+</td>
<td></td>
</tr>
<tr>
<td>UB</td>
<td>Tricep dip</td>
<td>30s</td>
<td>35s</td>
<td>14+</td>
<td>Bench</td>
</tr>
<tr>
<td>WB</td>
<td>Push press</td>
<td>30s</td>
<td>35s</td>
<td>14+</td>
<td>Sandbag</td>
</tr>
<tr>
<td>Core</td>
<td>Prone plank</td>
<td>30s</td>
<td>35s</td>
<td>14+</td>
<td>Mat</td>
</tr>
<tr>
<td>AT</td>
<td>Star Jumps</td>
<td>30s</td>
<td>35s</td>
<td>14+</td>
<td></td>
</tr>
</tbody>
</table>

Repeat 3 times (3.5 min rest between sets)

Table 4 – example session – week 10 (note rest interval decrease, additional core control station and exercise progressions (e.g. progression from deadlift in week 6 to kettlebell swing in week 10)

<table>
<thead>
<tr>
<th>Type</th>
<th>Exercise</th>
<th>Reps</th>
<th>Rest</th>
<th>Intensity</th>
<th>Equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>WB</td>
<td>Romanian deadlift to high pull</td>
<td>30s</td>
<td>30s</td>
<td>14+</td>
<td>Sandbag</td>
</tr>
<tr>
<td>LB</td>
<td>Walking lunge</td>
<td>30s</td>
<td>30s</td>
<td>14+</td>
<td>Sandbag or Kettlebell</td>
</tr>
<tr>
<td>UB</td>
<td>Bent over row</td>
<td>30s</td>
<td>30s</td>
<td>14+</td>
<td>Sandbag or Kettlebell</td>
</tr>
<tr>
<td>AT</td>
<td>Seal jumps</td>
<td>30s</td>
<td>30s</td>
<td>14+</td>
<td></td>
</tr>
<tr>
<td>Core</td>
<td>Prone plank</td>
<td>30s</td>
<td>30s</td>
<td>14+</td>
<td>Mat</td>
</tr>
<tr>
<td>WB</td>
<td>Squat press</td>
<td>30s</td>
<td>30s</td>
<td>14+</td>
<td>Sandbag</td>
</tr>
<tr>
<td>LB</td>
<td>Kettlebell swing</td>
<td>30s</td>
<td>30s</td>
<td>14+</td>
<td>Kettlebell</td>
</tr>
<tr>
<td>AT</td>
<td>10m shuttles</td>
<td>30s</td>
<td>30s</td>
<td>14+</td>
<td></td>
</tr>
<tr>
<td>Core</td>
<td>Deadbug (double)</td>
<td>30s</td>
<td>30s</td>
<td>14+</td>
<td>Mat</td>
</tr>
<tr>
<td>UB</td>
<td>Push up</td>
<td>30s</td>
<td>30s</td>
<td>14+</td>
<td>Mat</td>
</tr>
<tr>
<td>WB</td>
<td>Push press</td>
<td>30s</td>
<td>30s</td>
<td>14+</td>
<td>Sandbag</td>
</tr>
<tr>
<td>Core</td>
<td>Banded wood chop</td>
<td>30s</td>
<td>30s</td>
<td>14+</td>
<td>Resistance band</td>
</tr>
<tr>
<td>AT</td>
<td>Star Jumps</td>
<td>30s</td>
<td>30s</td>
<td>14+</td>
<td></td>
</tr>
</tbody>
</table>

Repeat 3 times (3.5 min rest between sets)

Mr. Henry Blake – Alliance for Research in Exercise, Nutrition and Activity (ARENA), UniSA Allied Health and Human Performance, University of South Australia