



**TRAM (Train and Retain Academic Musculoskeletal clinicians)
MB-PhD Project Summary**

PhD project Title: Development of strengthening activities to improve musculoskeletal outcomes in home working employees

PhD supervisors (please provide name, affiliation and email) [At least two supervisors]

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Background

Musculoskeletal disorders (MSKD) are the leading causes of employees sickness absence in the UK. In 2020/21 musculoskeletal disorders (MSKD) accounted for 28% of all work-related ill-health cases with 18.4 work days a year lost for those affected by MSKD. (1) Physical activity (PA) has been shown to be important in improving and preventing MSKD. (2) However, national level surveillance data suggested that only 31% of men and 24% of women in the UK met both the aerobic and strength guidelines. (3) With approximately 78% of adults in employment, (4) targeting PA through the workplace as a means to improve MSKD health has the potential to generate widespread impact for both individual employees and workplaces.

To date, both research into and public promotion of physical activity has largely focused on aerobic activity, with limited research considering what has been called the ‘forgotten guideline’ for strengthening activities. (5) The role of strengthening activities in improving and maintaining health are well known and include reducing muscle loss (both quality and quantity), falls prevention and bone strengthening (6). Increasing strengthening activities in employees could therefore be an effective strategy for these key workplace issues.

However, there is limited evidence on best approaches to increase participation in strengthening activities in the workplace; in a 2014 review examining the effectiveness of workplace PA interventions, limited details were provided on the components of PA interventions that could improve MSKD outcomes. (7) In addition, limited qualitative research exploring barriers and facilitators to such exercise in the workplace are available making developing and delivering impactful interventions in this key setting difficult. With many employees now working from home with many less physically active than before the pandemic, exploring ways to increase strengthening activities for the purpose of reducing MSKD in this population specifically is essential.

Aims

The aims of this PhD are:

- Aim 1.** To systematically review existing literature on strength activities to improve MSKD in employees
- Aim 2.** To identify barriers and facilitators to strengthening activities in employees
- Aim 3.** To develop and pilot test a strength activity based intervention to improve MSKD in employees

Training and experience provided [Include types of methodologies that will be employed]

Objective 1: Conduct a systematic literature review (Aim 1)

The first phase of this PhD will be to conduct a systematic literature review of workplace interventions to improve MSKD and identify key components of successful interventions for future



intervention development. This review will help to inform the intervention delivered as part of objective three.

Objective 2: Conduct intervention development workshops (Aims 2 and 3)

In the second phase, workshops will be conducted to 1) identify employees and managers views on strengthening activities to improve MSKD including potential barriers and facilitators and; 2) inform intervention development. A workplace will be recruited through existing contacts of the research team. Three to five workshops will be held with groups of 5 to 10 employees each. The findings from these will be used to inform the development of an intervention for testing in objective 3.

Objective 3: Test a workplace MBSBA intervention (Aim 3)

The research team will work with the PhD student to review the findings from objectives 1 and 2 and develop an intervention. The intervention will be trialled over an 8 week period using a pre-post study design with a 6 month follow up. To estimate the impact on MSKD in a future trial, hand grip strength and 1 rep max for leg press will be measured in addition to Roland-Morris Disability Questionnaire and the Keele STarT Back Screening Tool. Secondary outcomes will include Health related quality of life (HRQL), stress (Perceived Stress Scale), productivity (HWQ), work performance (HPQ short) and work engagement (UWES). Follow up focus groups will identify views on the feasibility and acceptability of the intervention and intervention procedures.

Training needs: This PhD will help to develop diverse but complimentary skill sets for clinicians. Training on all aspects of this project will be provided through existing university courses and by the research team and their wider networks.

Expected outcomes

Significant changes in hand grip strength and 1 rep max for leg press will be measured in addition to Roland-Morris Disability Questionnaire and the Keele STarT Back Screening Tool. Secondary outcomes will include Health related quality of life (HRQL), stress (Perceived Stress Scale), productivity (HWQ), work performance (HPQ short) and work engagement (UWES).

References

1. Ciolac EG, Rodrigues-da-Silva JM. Resistance Training as a Tool for Preventing and Treating Musculoskeletal Disorders. *Sports Med.* 2016;46(9):1239-48.
2. Nestler, K., Witzki, A., Rohde, U., R  ther, T., Tofaute, K. and Leyk, D., 2017. Strength Training for Women as a Vehicle for Health Promotion at Work. *Deutsches Arzteblatt Online*,.
3. The Scottish Government. The Scottish Health Survey 2017 [Available from: <https://www.gov.scot/binaries/content/documents/govscot/publications/statistics/2018/09/scottish-health-survey-2017-volume-1-main-report/documents/scottish-health-survey-2017-main-report/scottish-health-survey-2017-main-report/govscot%3Adocument/00540654.pdf>].
4. Office for National Statistics. Labour market overview, UK: August 2019 2019 [Available from: <https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/bulletins/uklabourmarket/latest>].
5. Strain T, Fitzsimons C, Kelly P, Mutrie N. The forgotten guidelines: cross-sectional analysis of participation in muscle strengthening and balance & co-ordination activities by adults and older adults in Scotland. *BMC Public Health.* 2016;16(1):1108.
6. Warburton DER, Bredin SSD. Health benefits of physical activity: a systematic review of current systematic reviews. *Curr Opin Cardiol.* 2017;32(5):541-56.
7. Neuhaus M, Healy GN, Dunstan DW, Owen N, Eakin EG. Workplace sitting and height-adjustable workstations: a randomized controlled trial. *Am J Prev Med.* 2014;46(1):30-40.