



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

### PhD project Title

Developing and piloting a weight management intervention for people with lower limb arthritis to improve mobility and wellbeing

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

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### Background

Mobility difficulties and joint pain are commonly experienced by people living with obesity and contribute to a lower quality of life. Indeed, obesity plays a role in the aetiology and severity of knee osteoarthritis (OA) and complicates its surgical treatment, with patients with obesity advised to lose weight as part of their management and prior to any surgery (1).

Webb et al (2021) showed in a meta-analysis of 19 trials in adults with osteoarthritis (n=17 knee OA), that both diet/meal replacement and very low-energy diet interventions resulted in weight loss of 8-13% with a concomitant improvement in physical function (2). The value of combining weight loss interventions with physical activity was systematically reviewed by Alrushud et al. in 2017 in adults aged >55 years old with knee OA, showing no superiority of a combined diet and exercise intervention over control in a small number of participants (3). The review highlighted a gap in the evidence base, with a limited number of low-quality trials, and a need for further research investigating the value of each component in multimodal interventions.

Secondary analysis (1) of the IDEA trial (4), in people with knee OA, showed that substantial weight loss ( $\geq 10\%$  of body weight) with diet and/or diet + exercise led to a significant improvement in quality of life, physical function, and inflammation, compared to lesser weight loss. In fact, even greater initial weight loss ( $>20\%$  baseline body weight) translated into greater benefits in clinical and functional outcomes even after 18 months. However, implementing, achieving and maintaining weight loss remains a challenge. Lack of motivation was a key barrier to weight management reported by people living with obesity and knee OA, with those with a BMI  $>40\text{kg/m}^2$  preferring access to NHS or patient support groups over dietary guidance (5).

There is a gap in the evidence base on how to make weight management programmes appealing and engaging, over the long term, for people with lower limb arthritis. This includes exploring diet modalities, as well as remote versus face-to-face programmes, and differences in perception and acceptability across socio-economic and ethnic groups, as well as developing tools to signpost to existing and future weight management modalities through primary or secondary care.

Therefore, this PhD studentship proposes a mixed method approach to develop and pilot a co-produced weight management intervention for people with lower limb arthritis, with a view to improve mobility and wellbeing

### Aims

- To systematically review and scope the literature focusing on weight management and mobility in people experiencing lower limb arthritis to better define intervention components.
- To establish, knowledge, attitudes and practices related to weight management and mobility in people living with overweight/obesity and lower limb arthritis.
- To carry out qualitative interviews focusing on barriers for weight management, and how weight management opportunities can be better highlighted to these patients.
- To design and deliver a feasibility study informed by surveys and interviews, in people with lower limb arthritis, focusing on weight management with / without exercise.
- To establish and engage with a PPI group throughout the study to inform and develop the cross-sectional tools (semi-quantitative surveys and qualitative interviews) and the feasibility study.

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

- Techniques in systematic / scoping review (and possibly meta-analysis) of scientific literature.
- Study design, protocol writing, ethics application development, recruitment of patients/participants to studies.
- Semi-quantitative survey design, dissemination, and data analysis and synthesis.
- Qualitative data collection and analysis, using semi-structured interviews.
- Pilot intervention development and implementation, including development of outcome sets.
- Pilot trial data reporting and synthesis.
- Dissemination of findings, including peer-reviewed publications, conference presentations, and tailored communication with specific audiences (e.g. health practitioners).

### Expected outcomes

- Inform implementation of weight management in people with lower limb arthritis.
- Improved outcomes for patients (functional, work, QoL etc).
- Potential for reduced requirement for healthcare use, including surgery with cost-savings.

### References

1. Messier SP, Resnik AE, Beavers DP, Mihalko SL, Miller GD, Nicklas BJ, et al. Intentional weight loss in overweight and obese patients with knee osteoarthritis: is more better? *Arthritis care & research.* 2018;70(11):1569-75.
2. Webb EJ, Osmotherly PG, Baines SK. Physical function after dietary weight loss in overweight and obese adults with osteoarthritis: a systematic review and meta-analysis. *Public Health Nutrition.* 2021;24(2):338-53.
3. Alrushud AS, Rushton AB, Kanavaki AM, Greig CA. Effect of physical activity and dietary restriction interventions on weight loss and the musculoskeletal function of overweight and obese older adults with knee osteoarthritis: a systematic review and mixed method data synthesis. *BMJ open.* 2017;7(6):e014537.
4. Messier SP, Mihalko SL, Legault C, Miller GD, Nicklas BJ, DeVita P, et al. Effects of intensive diet and exercise on knee joint loads, inflammation, and clinical outcomes among overweight and obese adults with knee osteoarthritis: the IDEA randomized clinical trial. *Jama.* 2013;310(12):1263-73.
5. Howarth D, Inman D, Lingard E, McCaskie A, Gerrand C. Barriers to weight loss in obese patients with knee osteoarthritis. *The Annals of The Royal College of Surgeons of England.* 2010;92(4):338-40.