

'Movement Screening and Interventions for Preventing Injury and Osteoarthritis'

Summary of Meetings

Monday 1st Dec (Nottingham) and Wednesday 3rd Dec 2014 (Southampton)

1. Background

The main purpose of setting up this international group was to gain consensus in the use of movement screening tools and intervention programmes, to develop a strong evidence-based approach for future practice. In the Arthritis Research UK Centre for Sport, Exercise and Osteoarthritis (SEOA), use of movement screening tools is primarily to inform and monitor effects of interventions for preventing injuries and progression to osteoarthritis. For others, the primarily use of screening tools is to assess injury risk.

On setting up the current group, three other movement screening initiatives were identified:

- a. A Summit (in USA) on functional movement assessment for injury risk, identified the need to harmonise approaches and what research is needed. They reviewed three screening tools (Teyhen et al 2014);
- b. Anna Frohm (Karolinska Institute, Sweden) held a meeting in Monaco in 2014
- c. An international group, led by Prof Carolyn Emery in Calgary, is conducting a systematic review on movement screening tools for injury prevention, in association with the International Olympic Committee.

There is representation from each of these initiatives in the current group.

The various screening tools available assess different aspects of movement, with various levels of evidence to support them. The main challenge is to decide which tool is appropriate for which purpose, such as a specific sporting group, injury risk, prevention strategy, rehabilitation need etc. It is clear that one tool will not suit all needs.

These notes summarise points discussed and recommendations for short-term actions.

2. Summary of Discussions

In total, 28 people attended the two meetings (four attended both meetings). The first was held in Nottingham on 1st December during the Patient and Public Involvement day of the Arthritis Research UK Centre for Sport, Exercise and Osteoarthritis Conference on 'Translation for Impact in Medical Research: Science and Practice'. The second meeting on 3rd December at the University of Southampton included a Skype call with colleagues in the USA (see Appendix of attendees). At the first meeting, the majority of participants were current or potential users of screening tools, while the second meeting mainly involved groups developing and validating screening tools and interventions. The emphasis of discussions on the two days therefore differed but the common goal was to address the need for clarity and consensus in the field of movement screening and interventions.

Points discussed include:

- 2.1 It is not the intention of the group to prescribe which tools (screening or interventions) should be used but to harmonise approaches to research, so that outcomes can be compared between studies using the various screening tools and interventions.
- 2.2 It is recognised that the purpose of using screening tools varies, e.g. assessing risk of injury, using movement screening to develop / inform exercise interventions to correct movement patterns in research and / or clinical practice. Others are developing screening tools and examining the science behind them.

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- 2.3 Consistency in the science and methodology (protocols) of movement screening is needed. Alignment of how studies are conducted is needed to compare between outcomes of reliability and validity studies of screening tools. Research on the specificity and sensitivity of screening tools is lacking.
- 2.4 A single screening tool would not meet all needs but it would be desirable to have a non-commercially available short (less than 15 minutes), generic, tool with a core battery of movement screening tests for the general population, with add-on tests that are sport-specific or population specific e.g. military groups. Some screens already have these levels of tests. It was agreed that tests shown to be valid and reliable that are common to existing tools could form the basis for such a generic set of tests.
- 2.5 Agreement on a common language around movement screening and interventions is needed. The diverse terminology used contributes to a lack of cohesion within the field and causes literature searches to fail in capturing the full picture.
- 2.6 The strengths and weaknesses of different tests need to be documented in relation to the aims for specific purposes and populations.
- 2.7 Screening tools vary in the level of detail they produce about movement problems. The criteria used to assess movement and scoring systems vary.
- 2.8 Instructions need to be simple and unambiguous, as this will affect sensitivity and reliability of tests. An example was the single leg squat, which is common to different screening tools and tested widely for validity and reliability. Depending on where the non-stance leg is e.g. in front (similar to y balance test, anterior reach part), behind, just off floor or higher, affects trunk position and movement.
- 2.9 There are pros and cons of specifying a test procedure rigidly. On the one hand this would enable accurate assessment of whether a particular manoeuvre can be achieved against a benchmark but it would restrict the ability to assess compensation strategies to inform the need for intervention. The instructions therefore need to consider the purpose of the test and both forms of instruction might be used for the same test during a screen, when appropriate.
- 2.10 More motor control is an important component to include when assessing movement, rather than just considering flexibility or mobility.
- 2.11 Incorporating an element of fatigue into testing is also important to consider for particular sports and occupations.
- 2.12 Evidence for effectiveness of injury prevention interventions and their implementation is emerging and an example was discussed (Padua et al., 2014).
- 2.13 For implementing an intervention programme for specific sports/groups, it is more feasible to assess a team using a generic screen and apply a group intervention, rather than programmes for individuals. Sensitive screening tools can indicate those individuals needing targeted intervention.
- 2.14 The Ministry of Defence (MoD) is a partner organisation within the Arthritis Research UK Centre for SEOA. The combination of the Centre's strong scientific basis and robust practitioner focus is optimal for the needs of the MoD with respect to the applications of movement screening to support prehabilitation and injury mitigation. Large databases from military cohorts also provide a very beneficial resource for advancing research for both military and non-military use. Given the large scale of data collection and management involved in screening military cohorts, it is essential that appropriate screening tools are used. Before further large scale data collection, it was agreed that comprehensive analysis of existing data from MoD cohorts would be undertaken to inform the most efficient, effective and cost-effective use of screening in future. Such analysis would include identifying: the most appropriate tools for answering specific questions, assessing specific groups (e.g. needs of the Army will differ from those of the Air Force personnel); redundant data etc.

During the second meeting, it was agreed that interim action was needed whilst awaiting completion of activities that will guide research priorities and promotion of use of tools:

3. Recommendations proposed for a way forward

- 3.1. Await **systematic review** of movement screens from the Calgary group.
- 3.2. Conduct **retrospective analysis of UK military cohort data** to inform future use of screening tools – refine protocols, avoid redundant data, target movement tests to needs of specific cohorts etc.
- 3.3 **Scope current landscape** and share approaches to **align protocols** and outcome measures for future research, to generate data for meta-analysis from various tools – Southampton will set up this forum.
- 3.4. Build **glossary of terminology** used in the field – Southampton will draft and update, as part of the forum activities in 3.3.
- 3.5. Decide on the specific **long-term goals** of the group, encompassing the needs of its constituents, and establishing which goals will be feasible to achieve
- 3.6. In the interim, in terms of which tool(s) to use, compile a set of tests common to different screening tools, for use by consumers seeking advice e.g. military cohorts currently set to implement screening of large cohorts and others wishing to screen specific sports. This **interim screening tool** will consist of a battery of tests already validated and shown to be reliable. Southampton will draft list of tests for circulation to the wider group to gain consensus.

References

- Padua DA, Barnett F, Donaldson A, de la Motte S, Cameron KL, Beutler AI, DiStefano LJ, Marshall SW. Seven Steps for Developing and Implementing a Preventive Training Program: Lessons Learned from JUMP-ACL and Beyond. Clin Sports Med 2014 In press
- Teyhen D, Bergeron MF, Deuster P, Baumgartner N, Beutler AI, de la Motte SJ, Jones BH, Lisman P, Padua DA, Pendergrass TL, Pyne SW, Schoemaker E, Sell TC, O'Connor F. Consortium for Health and Military Performance and American College of Sports Medicine Summit: Utility of Functional Movement Assessment in Identifying Musculoskeletal Injury Risk. Current Sports Medicine Reports 2014: 13(1): 52-63.

Professor Maria Stokes
University of Southampton
10th December 2014
Email: m.stokes@soton.ac.uk

Appendix - List of Attendees

Mon 1st December 2014 14.50-16.00 hrs

Centre Translation Conference, King Charles Suite, St James' Hotel, Nottingham

16 attendees

Dr Nick Allen - Birmingham Royal Ballet
 Matt Attwood – University of Bath
 Nadine Botha - University of Southampton
 Professor Mark Batt, University of Nottingham
 Dr Charlotte Cowie – St George's Park
 Professor Carolyn Emery – University of Calgary
 Dr Anna Frohm – Karolinska Institute, Sweden
 Dr Roger Hawkes – European Golf Tour
 Dr Rod Jaques – English Institute of Sport
 Jackie Knox – Physiotherapy practice in Lincolnshire
 Dr Anna-Louise McKinnon - Professional Jockey Association
 Bruce Paton – University College London
 Dr Keith Stokes – University of Bath
 Professor Maria Stokes - University of Southampton
 Dr Martin Warner - University of Southampton
 Dave Wilson - University of Southampton

Wed 3rd December 2014 10.00-13.00

Biomechanics Lab, Building 45, Highfield Campus, University of Southampton

16 attendees (2 via Skype from USA at 12 noon)

Dr Sandra Agyapong- Badu – University of Southampton
 Nadine Botha - University of Southampton
 Dr Kate Button – University of Cardiff
 Dr Jo Fallowfield – MoD co-ordinator, Royal Navy
 Dr Alex Forrester - University of Southampton
 Dr Anna Frohm – Karolinska Institute, Sweden
 Dr Cara Lewis – University of Boston, USA (via Skype)
 Dr Lynn O'Donnell – MoD (Army)
 Professor Darin Padua – University of North Carolina, USA (via Skype)
 Dr Liba Sheeran – University of Cardiff
 Ali Stockdale – MSc student, University of Southampton
 Professor Maria Stokes - University of Southampton
 Dr Martin Warner - University of Southampton
 Nick Webb – MSc student, University of Southampton
 David Wilson - University of Southampton
 Jess Wootton – MSc student, University of Southampton

28 attendees in total (four attended both meetings)

NB. A list of people involved/interested in this group is being compiled, which extends beyond those able to attend these two meetings
 If you have suggestions of other people who might be interested in joining this group, please send their name and contact details or ask them to contact Joanne Bartram (Joanne.Bartram@nottingham.ac.uk)

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