2nd International Movement Screening Workshop

Thursday 8 October 2015

Faculty of Health Sciences, Building 45, University of Southampton, UK

Notes from Discussions - (10th November 2015)

1. **Welcome and Purpose of the Day** – Maria Stokes
   Brief overview of*:*

1.1 Purpose of the Group - Gain international consensus in use of movement screening tools and intervention programmes, to develop a strong evidence-based approach for future practice

1.2 Progress since recommendations from first Workshop in December 2014:

Skype meetings had taken place of the core group (members indicated in attendees' list below) to review progress and plan the present workshop.

a. Systematic review of movement screening tools – led by Jackie Whittaker (Alberta, Canada, assisted by Nadine Botha and Dave Wilson, Southampton). Two systematic reviews on functional performance tests (Hegedus et al. *Br J Sports Med* 2014 doi:10.1136/bjsports-2014-094094 and 2015 doi:10.1136/bjsports-2014-094341) were noted but do not conflict with the current review, which focusses on tools to assess quality and control of movement, rather than performance of tasks (see definitions below 4.2.) .
b. Retrospective analysis of UK military cohorts to inform future use of tools – funding secured by Southampton for PhD studentship (see point 4.5).
c. Scope current landscape and share approaches to align protocols and research outcome measures. Exchange visits between labs have begun, with Dave Wilson currently in Calgary, Jackie Whittaker currently in Southampton and Cara Lewis due to visit Southampton and other UK labs in January 2016.
d. Glossary of terminology – part of systematic review
e. Decide feasible long-term goals of the group, encompassing needs of members – today's workshop task
f. Compile an interim battery of tests already validated and reliable – too many inconsistencies, so not realistic and no longer a goal of the group
g. Resources – Arthritis Research UK Centre for Sport, Exercise and Osteoarthritis is providing administrative support for the group (Jo Bartram: email: Joanne.Bartram@nottingham.ac.uk). The Centre also funded the three Travel Fellowships for exchange visits mentioned above, as well as the PhD studentship.

1.3 Purpose of the Day

Revisit and prioritise goals of the group
Decide on mode of operating

2. **Workshop: Systematic review of movement screens:** assessing quality of papers

- Jackie Whittaker gave the following overview

a. Importance of assessing study quality during a systematic review
b. Deciding on what quality assessment tool to use
c. Examples of tools and their application
   - Downs and Black
   - Oxford Levels of Evidence
   - COSMIN: **Co**nsensus-based **S**tandards for the selection of health **M**easurement **I**nstruments
d. Establishing quality cut-offs for synthesis

Progress of system review to date:

a. 1016 papers on initial search. Aim less than 50 papers to review by two reviewers.
b. Need to review the returned papers to determine if the search strategy is performing correctly.
c. Need a pool of raters, including those who know the tools. 2-3 groups each looking at data extraction, measurement, quality. Training of novice investigators will be required.
d. Review will need to take place quickly after searches, so it will not have to be repeated.
e. Systematic Review Team will draft a glossary of terms and perhaps use '1000 Minds' to gain consensus and consult as widely as possible, involving people outside the group.

3. General Discussion on Movement Screening Definitions/Terminology/Approaches – Chaired by Mark Batt

The meeting was joined by delegates via Skype (mainly from overseas)

Psycho-social aspects – how will they be measured? Questionnaires? Subjectivity of self-rated and clinician-rated parameters was discussed.

Terminology (see point 4.2). There was lengthy discussion about terms, which can be interpreted differently so standard terms need to be defined. Definition of some terms to be run past neuro specialists to avoid ambiguity or confusion, such as motor control, movement control neuromuscular control etc

Sarah de la Motte is currently undertaking a systematic review of physical fitness components and musculoskeletal risk, which is not the same as the Group's planned systematic review. Sarah is kindly willing to share the initial paper (publication pending) with the Group.

4. Task Group Updates

Specific tasks identified at the December 2014 workshop, and since then, have been monitored by the core group. Brief (10 min) updates from task group leads were:

4.1 Systematic Review *- Jackie Whittaker*

Objective is to see if movement quality screening can predict lower limb injury in sports and/or occupations. Extract how people have defined tests to reach consensus around terms. Systematic review strategy has been devised with a librarian at University of Alberta and will be peer reviewed by a second librarian. Plan to assess quality of papers and measurement properties of identified tools. Proposal to use COSMIN for this so all papers can been reviewed, as well as Downs & Black and Oxford Levels of Evidence. Back injuries will not be included in the search (lower limb i.e. hips down only). Start of systematic review depends on training needs of reviewers but hoping for a 12 month completion timeframe.

Actions: JB to email full Group for volunteers to rate papers

NB to review the articles from the first search to see if we are capturing the key papers and whether we need to change or add any search terms.

4.2 Terminology *- Dave Wilson / Nadine Botha/Jackie Whittaker*

This task forms part of the systematic review. There is currently no consensus on terminology used. The current working definitions, which are yet to be debated and refined are:

Movement Screening – overall definition

The assessment of single movement or a composite movement battery by physical performance and/or movement quality outcomes.

Types of movement screening:

Physical Performance Tests

Objective outcome(s) of sport or occupational strength, power, balance agility etc. often through multi-joint movements (e.g. Triple Single Leg Hop, Star Excursion Balance Test etc.)

Movement Quality

Identifying and rating functional compensations, asymmetries, impairments or efficiency of movement control through transitional (e.g. squat, sit-stand, lunge) or dynamic (hopping, walking, landing, cutting) movements tasks.

4.3 Validity and Reliability reporting *- Tanya Mackenzie*

Tanya Mackenzie (University of Salford) had expressed concern about the lack of reporting of reliability and validity of movement screening tools in recent literature. She was unable to attend the meeting but sent text to be read out at the meeting, which is summarised:

Reliability and validity of screening tests are being conducted but not reported, as journals are not keen on publishing this type of report because it is not attractive to their readership. Journals are encouraging one-line statements in 'Methods sections', stating reliability has been established, which does not allow the reader to evaluate the rigour of the reliability and validity of the tools used. Implications of lack of reporting include:

a. *Methodological quality of a study cannot be ascertained without description of the study design (type of reliability/validity tested), population, procedures, statistical analysis.*
b. *Duplication of reliability studies occurs, as there are no previously-published studies to refer to that have established the reliability of specific screening tests. This additional work is unproductive.* [The group agreed that formal studies should be reported to avoid such duplication but small scale studies are always needed to establish reliability in the hands of each investigator/study team.]
c. *Research findings can be applied to practice based on poor quality research.*

A Task Group was set up but effective ways to address this are needed. Possible approaches:

a. *Bring this problem to the attention of journal editors by letter, to make the editors aware that there is a need for this type of reporting.*
b. *Identify which journals are more aligned with the publication of reliability and validity studies and bring these to the attention of fellow researchers.*

Action: Volunteers to support Tanya in this task group were invited to contact Jo Bartram.

4.4 ***Military Screens*** *- Jo Fallowfield*

Jo outlined the need for movement screening tools to identify injury risk and inform interventions to reduce injury rates in the military. Injury during initial training of new recruits is a particular problem requiring urgent attention. The majority of groups across the UK military use the Functional Movement Screen (FMS), with one exception in the Royal Marines, where the Movement Competency tool was used (Nelstrop et al., yet to be published).

A pilot study (n=957) on the Predictive Validity of the Functional Movement Screen for Identifying Injury Risk in Royal Navy Recruits (Gibbs et al in prep), found:

a. The FMS appeared to be a valid predictor of injury risk in Phase-1 RN military training
b. Female recruits and those with a smoking history were at increased risk
c. The FMS appeared to be a relatively blunt tool in this military cohort
d. Predictive relationships in this large military sample were weak

Studies will aim to address the following questions (see 4.5 below):

a. Is the FMS appropriate for movement screening in military cohorts?
b. Are there redundant data (i.e. questions in the FMS that could be omitted to reduce the time to aid rapid screening)?
c. Can a movement screen be used to identify recruits at increased injury risk?
d. Are specific movement screens required to meet the needs of different military cohorts?
e. Can preconditioning/prehabiliation programmes reduce injury risk by better preparing recruits for initial military training?

The UK and US military research groups would explore aligning study approaches (see 6.2).

4.5 Southampton PhD student project *- Martin Warner / Conor Power*

Funding has been secured from Southampton Marine and Maritime Institute (SMMI) to study movement screening in military cohorts. Conor Power was recently recruited as the SMMI PhD student, with Martin Warner as lead supervisor, to address some of the questions posed by Jo Fallowfield (point 4.4 above). Conor's first task will be to carry out a retrospective analysis of a large military database then start prospective studies. His work will involve some validation in terms of comparison between movement screens versus biomechanical analysis.

5. Discussion in small groups (including those on Skype forming a group)

Topics introduced by Nadine Botha: functioning of the group; methods of communication and sharing information, harmonising research protocols, comparing data between screens and cohorts, maintaining the momentum, prioritising objectives etc.

6. Group Feedback and General discussion – chaired by Jackie Whittaker

The following points were agreed during feedback from small group discussions:

6.1 Functioning of the Group

Core group – meet via Skype regularly – make meeting notes available to wider group

6.2 Task Groups

Identify task groups (in addition to those in point 4) with time lines, e.g. literature review

- New Military group – UK & USA
- New Biomechanics group – others to join existing Southampton/Boston/Calgary/Cardiff collaboration
- New Intervention for injury prevention group

Members are invited volunteer for these new and the existing task groups – please email JB.

6.3 Communication

- Public web area on Arthritis Research UK Centre for Sport, Exercise and Osteoarthritis Website
- Private forum on independent website (e.g. Moodle)

7. Review objectives and time plan – summarised by the group

Short-term goals *– next 12 months*

a) Establish task groups, leads, members & time lines (core group will monitor progress)
b) Scoping purposes of using movement screening tools e.g. Survey Monkey
c) Consensus on terminology
d) Analysis of existing datasets from large military cohorts
e) Document strengths and weaknesses of existing tests in relation to aims for specific purposes and populations
f) Further goals to be informed by outcome of systematic review

Long-term goals *– 3 years*

a) Generic tool to predict injury and inform interventions for various applications and settings:
Primary & secondary care – injury/condition clinics
Pre-injury
General population (all ages)
Sporting populations
Military injuries
b) Harmonise research approaches and protocols for screening tools and interventions
c) Evidence for effectiveness of injury prevention interventions and their implementation
d) Further goals to be informed by outcome of systematic review

8. Next Workshop – Hip and Ankle. Thursday 21st January 2016, Southampton, details to follow.

Attendees

Name	Affiliation
Nick Allen ●	Birmingham Royal Ballet
Matt Attwood	University of Bath
Jo Bartram ○	Arthritis Research UK Centre for Sport, Exercise and Osteoarthritis (Group Administrator) Joanne.Bartram@nottingham.ac.uk
Mark Batt ○	Arthritis Research UK Centre, Director; University of Nottingham
Nadine Botha ○	University of Southampton (Group Co-ordinator)
Sharon Dixon	University of Exeter
Jo Fallowfield ○	Institute of Naval Medicine, UK
Frida Flodström	Swedish Sport Confederation Center, Sweden
Helen French ●	Royal College of Surgeons, Dublin, Republic of Ireland
Anna Frohm ○	Karolinska Institute, Sweden
Mo Gimpel	Southampton Football Club
Markus Heller	University of Southampton
Mike Hislop	University of Bath
Ian Horsley	English Institute of Sport
Anna-Marie Hughes	University of Southampton
Jacqueline Knox	Barn House Physiotherapy
Cara Lewis ● ○	Boston University, USA
Carly McKay	University of Bath
Sarah de la Motte ●	Uniformed Services University of the Health Sciences, USA
Sarah Mottram	University of Southampton
Paul Muckelt	University of Southampton
Bruce Paton	ISEH/University College London/UCLH
Conor Power	University of Southampton
Darin Padua ● ○	University of North Carolina, USA
Laura Smith	Defence Medical Rehabilitation Centre, Headley Court
Keith Stokes	University of Bath
Maria Stokes ○	University of Southampton (Group Chair)
Jackie Whittaker ○	University of Alberta, Canada (Systematic Review lead)
David Wilson ●	University of Southampton (on Travel Fellowship in Calgary)
Martin Warner	University of Southampton

● attended meeting via Skype ○ Core Group Member

Unable to access via Skype or received apologies:
Anthony Beutler - Uniformed Services University of the Health Sciences, USA
Carolyn Emery - University of Calgary, Canada
Eric Hegedus - High Point University, USA
Annette Heijne - Karolinska Institute, Sweden
Moira McCormack - UCL/ISEH/The Royal Ballet Company
Valerie Sparkes – University of Cardiff