

PHYSICAL CAPABILITY AND MUSCULOSKELETAL HEALTH

Programme overview

We define physical capability as the ability to undertake the physical tasks of daily living

Measures of physical capability and musculoskeletal health have been collected in the NSHD since midlife (see Fig. 1)

Key measures include:

- functional limitations and difficulties performing activities of daily living (ADLs) (from age 43)
- performance tests (grip strength, chair rising, standing balance and walking speed) (from age 53)
- bone and body composition scans (age 60-64)
- knee and hand osteoarthritis (age 53)
- related clinical outcomes (fractures, falls, osteoporosis, sarcopenia, frailty)

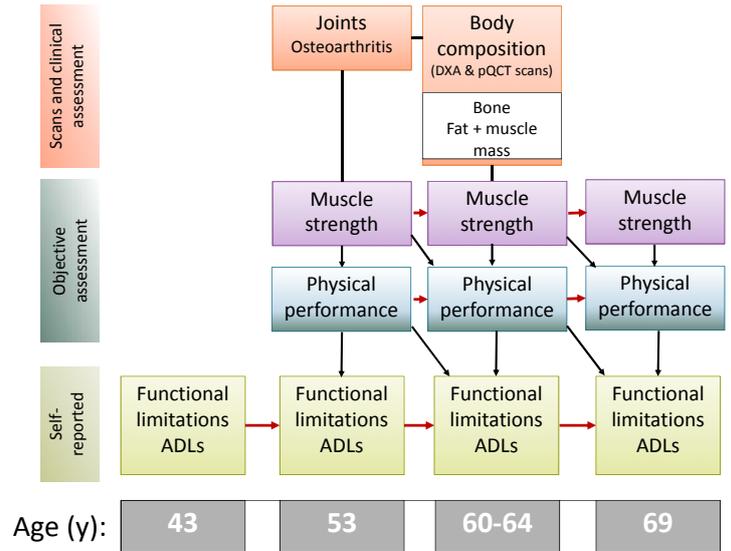


FIGURE 1: Data on physical capability and musculoskeletal health collected in the NSHD

WHY ARE PHYSICAL CAPABILITY AND MUSCULOSKELETAL HEALTH IMPORTANT?

Case study: Physical capability at 53y and survival over 13y of follow-up

In NSHD, we have found associations between better performance in tests of standing balance, chair rising and grip strength at age 53 and higher survival rates over 13y (see Fig.2 for results for grip strength as an example)

This was one of the first studies to highlight the value of objective assessment of physical capability in mid-life

There was widespread media interest in these findings:

Get a grip: study shows tests that predict a longer lifespan

Earlier deaths for people lacking speed and strength
British research could help identify those most at risk

Middle-aged and able to balance on one leg? You can hop for joy

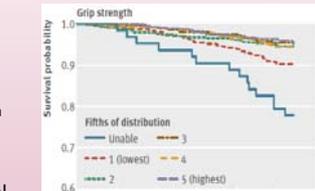


FIGURE 2: Probability of survival up to age 66y by grip strength at age 53y
Taken from Cooper et al, BMJ 2014; 348:g2219

Stay active for a longer life
By Sarah Cohen, Wednesday 27 April 2014
Two research papers just published in bmj.com, help shed new light on the importance of being physically capable in our middle years, and how more time spent being active may cut our risk of becoming disabled.

Maintaining physical capability and musculoskeletal health are key components of healthy ageing

Musculoskeletal conditions are one of the leading causes of disability and an important contributor to the global burden of disease

Our work using NSHD data, together with data from other studies, has demonstrated clear and consistent links between higher levels of physical capability and:

- higher survival rates (see Fig. 2)
- delayed onset of disease & disability
- higher levels of positive mental wellbeing

Study members tell us that 'physical decline' is an important challenge of ageing

HOW DOES IT CHANGE WITH AGE?

By collecting measures of physical capability multiple times we are able to assess how they change with age

We can then identify factors that may prevent age-related decline

So far, work in the NSHD suggests that there is a lot of variation in the level of age-related change observed and that factors across life are associated with this

Case study: How do mean levels of grip strength change across life?

Measures of grip strength recorded at ages 53 and 60-64 formed part of a cross-cohort study that explored how levels of grip strength change across life. This work showed average levels of grip strength increase in early life, plateau in midlife and decline in later life (see Fig. 3)

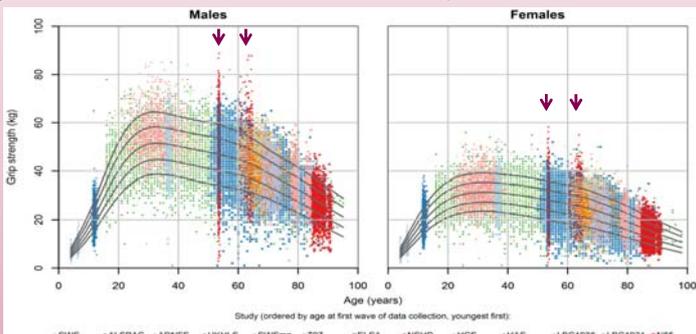


FIGURE 3: Centile curves for grip strength across 12 UK studies (incl. NSHD) Taken from Dodds et al, PLoS One 2014; 9(12):e113637

WHAT FACTORS ACROSS LIFE ARE ASSOCIATED WITH THESE MEASURES?

Much of our work has focused on understanding how modifiable factors across life influence physical capability and musculoskeletal health from midlife onwards

Factors shown to be important include:

Growth and body size

- Birthweight and childhood growth
- Timing of puberty and pubertal growth
- Infant motor development
- Adult overweight and obesity

Lifetime lifestyle and socioeconomic circumstances

- Leisure time physical activity
- Smoking
- Diet
- Indicators of socioeconomic position in childhood and adulthood

Other measures of function and health status

- Current health status & chronic disease
- Cognitive capability across life
- Type and timing of menopause

NSHD is one of the only studies in the world that can examine how factors from birth onwards influence such a wide range of inter-related measures and their age-related changes