

PHYSICAL CAPABILITY AND MUSCULOSKELETAL HEALTH

Current highlights

MARKERS OF NEURODEVELOPMENT AND CHANGES IN PHYSICAL CAPABILITY

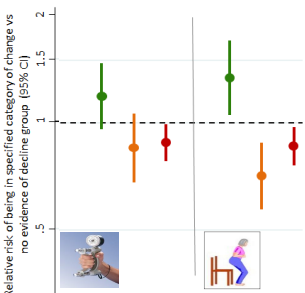
(R Cooper and D Kuh)

AIMS: (1) to describe changes observed in objective measures of physical capability from age 53 onwards

(2) to examine the associations of markers of neurodevelopment in childhood with these changes in physical capability

FINDINGS:

• Patterns of change in grip strength and chair rise speed between ages 53 and 60-64 are heterogeneous



• Higher childhood cognitive ability = reduced risk of decline in physical capability (see Fig. 1)

• Neurodevelopmental pathways may underlie functional decline in later life

• We are currently investigating whether similar patterns of association are found with other markers of neurodevelopment (incl. age at walking & finger and foot tapping at age 15)

• This work suggests new potential opportunities for early intervention to prevent age-related functional decline

FIGURE 1: Relative-risk ratios (RRR) of change in grip strength & chair rise speed per 1SD increase in cognitive score at age 8

REPRODUCTIVE FACTORS AND BONE HEALTH

(D Kuh and S Muthuri with J Adams, T Cole, C Cooper, R Cooper, R Hardy, K Mackinnon, A Moore and K Ward)

AIM: to investigate the influence of pubertal timing and menopause on bone size, strength and density

FINDINGS:

• Trabecular volumetric bone mineral density (vBMD) at 60-64 years was 9-10% lower in men and women who came late to puberty compared with those who came early (see Fig.2)

• There was also an 8% difference in vBMD for women who had an earlier rather than a later natural menopause

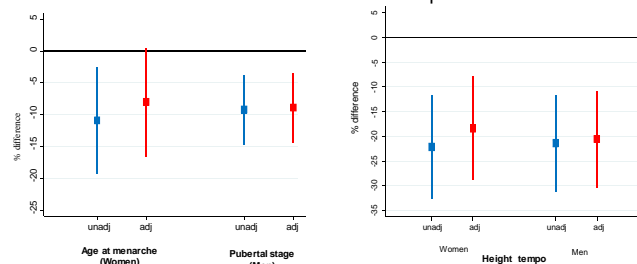


FIGURE 2: % differences in vBMD at age 60-64 by pubertal timing (comparing later puberty with earlier puberty)

These findings may be clinically important given a rate of bone loss from midlife of 1-2% per year, and that low BMD is a risk factor for fracture.

We now plan to investigate the links between menopause and muscle mass, strength and quality

LIFETIME INFLUENCES ON HIP AND SPINE SHAPES

(S Muthuri and D Kuh with RM Aspden, AV Pavlova, FR Saunders, RJ Barr and JS Gregory)

BACKGROUND: Variations in hip and spine shape are important as they relate to osteoporosis, osteoarthritis and low back pain

AIM: In collaboration with researchers from the University of Aberdeen, we aim to investigate the factors across life that influence hip and spine shapes in early old age.

PROJECT UPDATE: The first phase of the project (led by University of Aberdeen) has involved the generation of hip and spine mode scores from the DXA images collected at age 60-64 describing bone shape (see Fig. 3).

The second phase will involve an investigation of how a range of potentially modifiable factors (incl. markers of growth and changes in body mass index across adult life) are related to these scores.

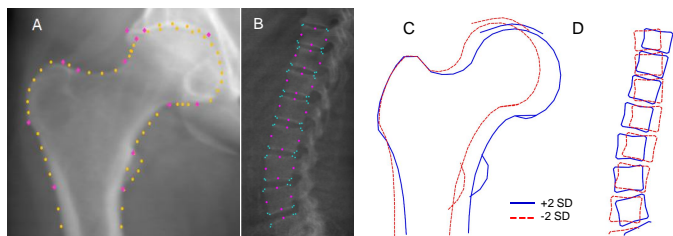


FIGURE 3: Typical images of the hip (A) and the spine (B) outlined using a statistical shape modelling program. C and D show the main variations in hip (C) and spine (D) shape

We are collaborating on many other ongoing projects which utilise NSHD data to address important research questions on physical capability and musculoskeletal health, these include investigations of the associations between:

- statin use and muscle performance (N Sharma)
- nutrition and bone (K Ward)
- lifetime cognition and bone (R Bendayan)
- physical performance and strength in midlife and subsequent disability risk (R Dodds)
- childhood growth and rates of low trauma fracture in adulthood (with researchers from the MRC Lifecourse Epidemiology Unit (LEU))

EXPLORING LOSS IN FUNCTION FROM MIDLIFE

(E Wloch, D Kuh and R Cooper)

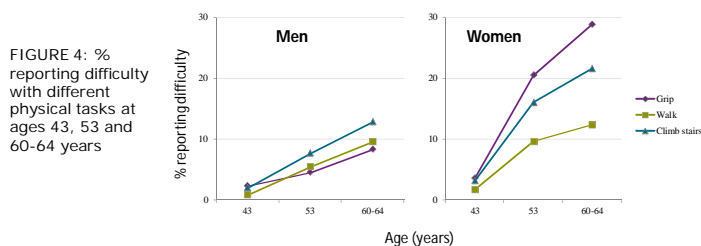
AIM: To explore the order in which people begin reporting difficulty with tasks of daily living from midlife onwards

FINDINGS:

• A strong hierarchical scale was established

• If individuals reported difficulty with tasks towards the top of the hierarchy at age 43 (for example climbing stairs), they were 3 times more likely to report difficulty with the most severe limitations, at the bottom of the hierarchy (for example feeding), by age 60-64

• This study is one of the first to highlight the importance of intervention in midlife to prevent functional decline



• Related work (led by R Bendayan) has shown that similar patterns of functional loss are observed when older English and American populations are compared.

- diet quality and physical capability (with researchers from the MRC LEU)
- functional limitations and daily patterns of activity (with Johns Hopkins University)

In the near future we will also be:

- examining links between common ageing symptoms (including pain and fatigability) and subsequent physical capability
- exploring the changes in physical capability up to age 69
- working with collaborators at the University of Bristol to utilise the new data on vertical impact of activity and its associations with bone health