

# Football and team handball training may increase health span and lifespan

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Danish and Swedish researchers explore the anti-aging effects of football and team handball training in women. Credit: Jacob Almtoft

In the quest for healthy aging and longer lifespan, Danish researchers at the University of Southern Denmark have collaborated with Swedish

researchers at Karolinska Institutet to explore the anti-aging effects of football and team handball training in women.

In a current study published in *Scientific Reports*, the researchers investigated the effects of lifelong regular exercise on two of the central hallmarks of aging combined and showed that football and team handball have a positive effect on telomere length and mitochondrial function in women.

"Our legacy consists of DNA that is packed in chromosomes. When cells divide, the inheritance is copied, but with each [cell division](#) the ends of the DNA threads get shorter. The so-called telomeres are shortened, which causes us to age. It is remarkable that engaging in [team sports](#) such as football and handball helps women to maintain longer telomeres and healthy mitochondria. It may potentially increase their health span, and ultimately, lifespan, as shorter telomeres and mitochondrial dysfunction are both associated with a number of age-related diseases and mortality," says senior researcher Muhammad Asghar, the study's shared senior author, of the Department of Medicine, Solna at Karolinska Institutet.

## **Younger biological age in the cells as evaluated by telomere length**

"We've recently shown that 65-80-year-old male football players are in excellent physical shape in comparison to untrained age-matched individuals, evidenced by markedly higher aerobic fitness, muscle mass and bone strength as well as a younger [biological age](#) in the cells as evaluated by telomere length," says Professor Peter Krstrup, the study's shared senior author, of the Department of Sports Science and Clinical Biomechanics at the University of Southern Denmark, and adds:

"Interestingly, the present study shows the same pattern, including a [positive effect](#) on mitochondrial health, in 60-80-year-old female team handball players, thereby supporting the evidence for an anti-aging potential of team sports."

"In addition to the positive findings in elderly team handball players, we observed that young female elite football players have ~23% longer telomeres in specific blood cells compared to untrained age-matched women," says Ph.D. Marie Hagman, the study's first author, of the Department of Sports Science and Clinical Biomechanics at the University of Southern Denmark.

"These results are striking because differences in [telomere](#) length of that magnitude are not normally found in young participants. It should be noted, however, that this is a cross-sectional study and that our findings need to be confirmed by future randomized controlled trials," Hagman explains.

The study involved 129 healthy, non-smoking women, including young elite football players (YF, n=29, 18-30 yrs), young untrained controls (YC, n=30, 18-30 yrs), elderly team handball players (EH, n=35, 60-80 yrs) and elderly untrained controls (EC, n=35, 60-80 yrs). The study was the first to investigate the effects of lifelong regular exercise in humans on two of the central aging hallmarks combined.

## **Elite football and lifelong team handball training are associated with beneficial anti-aging cellular effects**

The results of the study showed that elite football and lifelong team handball training are associated with beneficial anti-aging cellular effects in women. Specifically, young elite [football](#) players demonstrated higher [telomere length](#) and higher mtDNA copy number compared to young

untrained controls, while elderly team handball players showed healthy mitochondria compared to elderly untrained controls. These cellular adaptations were also positively correlated with VO<sub>2</sub>max and the amount of weekly exercise, emphasizing the importance for these [women](#), irrespective of age, to maintain a reasonable fitness and activity level.

**More information:** Marie Hagman et al, Football and team handball training postpone cellular aging in women, *Scientific Reports* (2021). [DOI: 10.1038/s41598-021-91255-7](https://doi.org/10.1038/s41598-021-91255-7)

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