Football strengthens the bones of men with prostate cancer

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Football is an effective type of training to promote musculoskeletal health. The FC Prostate study showed that the number of times the players accelerate and brake during football training is correlated to the changes in leg bone mass. Being challenged by an opponent, changing direction, kicking and blocking the ball provide a wide range of powerful stimuli to the bone tissue, making the bones stronger. Credit: Bo Kousgaard, Copenhagen Centre for Team Sport and Health.

Men with prostate cancer run the risk of brittle bones as a side-effect of their treatment. But one hour's football training a few times a week

counters many of the negative effects of the treatment, according to University of Copenhagen scientists.

Football training is not just good for the heart and the muscles. Running around the pitch, jumping, accelerating, braking and kicking the ball also strengthen the bones.

Even older men being treated for prostate cancer get stronger bones from playing football, according to two new articles published in *Osteoporosis International and European Journal of Applied Physiology*. The articles were part of a recently defended PhD thesis by Jacob Uth, a physiotherapist at the University Hospitals Centre for Health Research (UCSF) at Copenhagen University in Denmark.

This is remarkable, because men with prostate cancer normally have weaker bones as a consequence of the disease and especially because of the anti-hormone treatment given to patients to lower the level of testosterone in the body.

One side-effect of this treatment is that the bones become decalcified, so the men have an increased risk of osteoporosis, just like women going through the menopause.

"Football training counters many side-effects of the treatment. It is impressive to see such big improvements in both muscular strength and bone density, despite the anti-androgen treatment," says Peter Krustrup, who is Jacob Uth's supervisor and Professor of Team Sport and Health in the Department of Nutrition, Exercise and Sports at Copenhagen University.

"Our so-called FC Prostate study showed that just 12 weeks of football training increased leg bone mass and elevated the blood-borne bone formation markers osteocalcin and P1NP by 35 and 50%, respectively.

After 32 weeks of training we observed a systematic 1-2% increase in bone mineral density at the hip and upper part of the thigh bone in the football players compared to the control group, equivalent to bones 2-4 years younger, specifies Professor Krustrup.

Acceleration and braking make football effective

During the training, the players' movements were tracked precisely with GPS. The measurements show that the players' average speed was relatively low, but they performed 300 decelerations, 200 accelerations and 100 running bouts per hour of football training session. This is believed to be the reason why football is better for the bones than jumping on and off a step bench, for example.

"The changes in bone mass in the legs of the football group show a significant correlation with the number of times they accelerate and brake. This gives an indication that the effect is linked to the specific activity that we see in football, where there is interval running with a lot of accelerating and braking which place great stress on the bone tissue, and that is what makes them stronger," says Uth and continues.

"The more the bones are affected from different angles during exercise, the more complete the stimulation. When you change direction, kick and block the ball, and when you are challenged by an opponent as you are in football, there is a wide range of powerful stimuli to the bone tissue," he explains.

About the FC Prostate study

In all, 57 men aged between 43 and 76, with an average age of 67, took part. They were receiving treatment for prostate cancer. After drawing lots, the participants were divided into a football training group and a

control group.

The football group trained 2-3 times a week for 32 weeks, 45 to 60 minutes at a time. Before starting and after 12 and 32 weeks' training, both groups were tested with functional tests, blood sampling and DXA scanning.

Although it is now two years since the FC Prostate trial finished, many of the men are still playing football. They meet twice a week in the Copenhagen football club Østerbro IF organised under the Danish Football Association (DBU).

Provided by University of Copenhagen