

## MUSCLE OF AGEING FOOTBALL PLAYERS

**Narici MV<sup>1</sup>, Longo S<sup>2</sup>, Conte M<sup>3</sup>, Salvioli S<sup>3</sup>, Totti V<sup>4</sup>, Zancanaro M<sup>4</sup>, Roi GS<sup>4</sup>**



<sup>1</sup>University of Nottingham, School of Medicine, MRC-ARUK Centre of Excellence for Musculoskeletal Ageing Research, Derby Royal Hospital, Derby, United Kingdom; <sup>2</sup>Dept. of Biomedical Sciences for Health, University of Milan, Italy; <sup>3</sup>Dept. of Experimental, Diagnostic and Specialty Medicine, University of Bologna, Italy, <sup>4</sup>Education & Research Dept. Isokinetic Medical Group, Bologna, Italy

### Introduction

One of the most striking features of ageing is the loss of muscle mass and strength (sarcopenia). At the age of 60, about 50% of males and 60% of females are classified as sarcopenic (1). Several factors contribute to sarcopenia: neurodegenerative changes, inflammation, oxidative stress, decreased levels of anabolic hormones, alterations in protein metabolism and decreased physical activity (Narici MV, Maffulli N. Sarcopenia: characteristics, mechanisms and functional significance. *Br Med Bull* 2010; 95: 139-159). Injury and trauma, frequent in old age, accelerate sarcopenia by activation of inflammation and oxidative stress, stimulating protein catabolism pathways and inhibition of protein synthesis. Instead, regular physical activity has been shown to reduce sarcopenia and delay its onset: individuals that normally engage in medium to high intensity exercise preserve muscle mass compared to their sedentary counterparts (3). Furthermore, regular physical activity in old age has been shown to reduce inflammation and oxidative stress (Nicklas BJ, Brinkley TE. Exercise as a treatment for chronic inflammation in older adults. *Exerc Sport Sci Rev* 2009; 37: 165-170). However, little is known on whether former football players retain a greater muscle mass than sedentary controls with ageing and if the practice of recreational physical activity helps to prevent sarcopenia in this population. Hence the aims of the present study were to, 1) evaluate the prevalence of sarcopenia in an ageing population of former footballers, 2) establish whether the presence of knee injury and subjective signs of osteoarthritis were associated with the degree of sarcopenia, and 3) examine the role of physical activity in the prevention of sarcopenia in these former players.

### Methods

Fourteen former football players (means±SD age 59.3±7.7 yrs, age range 51-77 yr, BMI 25.9±4.2 kg/m<sup>2</sup>) from professional and non-professional leagues were admitted to the study. Two of these former athletes had played in Serie A (First league), three in Serie C, six in Serie D and three in VIth level (Promozione).

Each participant underwent the following evaluations:

- 1) muscle ultrasound for the assessment of sarcopenia;
- 2) the KOOS scale to assess the patients' opinion about their knee and associated problems;
- 3) questionnaires about their current physical activity.

The diagnosis of sarcopenia was based on a recently developed index of muscle architecture (2) obtained from the ratio between muscle fibre Length (Lf) to Muscle Thickness (MT) with reference to a non-sarcopenic young adult male population. Cut-off scores for sarcopenia were defined on the basis of the z-score of the sarcopenia-index (Lf/MT) values, patients with a z-score > 1 SD, were classified as sarcopenic.

Statistical significance of differences was tested using an unpaired Student's t-test, level significance was set at alpha values <0.05.

### Results

Seven (50%) out of fourteen former footballers were diagnosed as sarcopenic (z-score > 1 SD of young adult population).

Their Lf/MT ratio was  $4.5 \pm 0.7$  compared to  $3.8 \pm 0.6$  of the young adult reference population (18% difference,  $P < 0.001$ ).

The incidence of sarcopenia was lower in those former footballers that still engaged in sporting activities (cycling, swimming, running, tennis, basketball) compared to their sedentary counterparts.

Also, reported joint pain (KOOS score:  $93.5 \pm 10.6$ ; range: 58-100) was positively correlated with the index of sarcopenia ( $P < 0.001$ ).

### Conclusions

The present results show that half of the tested population of ageing footballers is sarcopenic.

The significant association between reported joint pain and sarcopenia suggests that inflammation and oxidative stress are probably mediators of muscle loss in this population and that joint pain acts as a barrier against physical exercise, exacerbating sarcopenia because of disuse.

This study also shows that previous high-intensity sporting activity, such as professional football sustained to early middle age (41 yrs), does not afford protection against sarcopenia past the 6<sup>th</sup> decade. Instead, regular physical activity, even if at a recreational level, seems useful for preserving muscle mass in former football players.

### References

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