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Letter to editor

High prevalence of patellar and Achilles tendinopathies in futsal athletes

Dear Editor-in-chief,

Futsal (indoor version of soccer), in the last decade, has gained popularity all over the world. The game is played 5 – a – side, and during the competitions unlimited substitutions are permitted. Body movements, during playing, are characterized by frequent accelerating and stopping, jumping and tackling (Junge et al., 2004; Nogueira Ribeiro and Pena Costa, 2006). Consequently, physical demands are very high (Castagna et al., 2009). Epidemiological studies report a high incidence of knee and ankle injuries, owing to playing characteristics and field hard surface (Junge et al., 2004; Nogueira Ribeiro and Pena Costa, 2006). However, to our knowledge, systematic studies on the structural damage of Patellar (PT) and Achilles (AT) tendons have never been performed. Aim of this letter is to report the prevalence and incidence of PT and AT tendinopathies, in the players of a top level futsal team.

Ultrasound (US) examinations were carried out at the beginning and at the end of the regular season. The diagnosis of tendinopathy and peritendinitis was performed using strict US criteria (Salini and Abate, 2011). Neovascularization was estimated by means of Colour Doppler, and graded as (0), (1+), (2++), (3+++), (4++++), according to the appearance of vessels inside the tendon (Alfredson and Ohberg, 2005).

Demographic and anthropometric data were registered. By self report, information about injuries, suffered in the past, or during the season, were collected. An injury was defined as pain or tendon discomfort regardless of the subsequent absence from match or training. Players who had tendon damage at US evaluation were compared with those free from abnormalities.

Data are reported as mean and standard deviation, frequencies and percentage. Student's *t* and χ 2 tests were used.

At the beginning of the season, 7 players (38.8 %) showed tendon degeneration, associated with neovascularisation in 7 / 9 tendons (Table 1). Out of them, all asymptomatic when observed, 5 had complained injuries in the past. The remaining 11 athletes were asymptomatic and without tendon abnormalities.

At the end of the season, in 3 players, among the ones who did not show tendon damage at the beginning, US revealed the onset of peritendinitis with neovascularisation. In most cases, tendinopathy was observed in the non dominant leg. Therefore, a total of 10 athletes (55.5 %) showed tendon damage at the end of the season. To sum up, 12 tendons had US signs of tendinopathy associated with neovascularisation in 10 (Table 1). Among these players, 8 reported tendon discomfort during regular season, and 4 were forced to stop playing for a short period (~ 10 days). All the US positive subjects had played for several years and were older (Table 2).

These results show that PT and AT tendinopathies are very frequent among futsal players. The high prevalence of tendon lesions, due to acute traumas and, more frequently, to overuse degeneration, may be explained by the playing characteristics : the frequent accelerating and stopping, jumping, tackling, and abrupt jerking movements can indeed cause significant stress on knee and ankle (Junge et al., 2004, Nogueira Ribeiro and Pena Costa, 2006).

Moreover, the low heel footwear can expose AT to higher straining and stretching, and the hard and adherent playing surface, that does not cushion the blows of the heel, can further stress this tendon (Cain et al., 2007). The higher prevalence of lesions in the non dominant leg can be explained by the fact that periods of play are mostly spent in single – leg stance on this leg, while the dominant foot manipulates the ball (Cain et al., 2007). To our knowledge, this is the first US study of tendinopathies in futsal, and, therefore, every comparison with other sports may be misleading. For example, Fredberg and Bolvig (Fredberg and Bolvig, 2002) found, in asymptomatic

Table 1. Tendinopathies in futsal athletes.

	N° of players	Achilles		Patellar		Total
		Dom	Non dom	Dom	Non dom	
Beginning of the season	7/18 *	1	5	1	2	9
New onset	3/18	0	1	0	2	3
End of the season	10/18	1	6	1	4	12
Neovascularization		1	5	1	3	
1+			●	●	●	
2++		●	●●		●●	
3+++			●●			
4++++						

Dom = Dominant side; Non dom = Non dominant side. * = two players had two tendons affected.

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Table 2 . Characteristics of US positive and negative athletes (data are reported as mean ± SD and range).

	All players (18)	Players with US damage (10)	Players without US damage (8)	p
Age	26 ± 5.3 (18-37)	28.2 ± 5.6	23.3 ± 3.5	ns
Weight	70.5 ± 4.8 (62-80)	70.2 ± 4.2	71 ± 5.6	ns
Height	175.1 ± 3.3 (170-182)	175.4 ± 3.9	174.8 ± 2.5	ns
BMI	22.9 ± 1 (21,2-24,9)	22.8 ± 0.7	23.1 ± 1.3	ns
Years of Futsal practice	12.2 ± 4.6 (5-22)	14.3 ± 4.6	9.7 ± 3.4	< 0.03

soccer athletes, at baseline, a percentage of AT and PT degeneration slightly lower than the one we observed in our group (34 % *vs* 38.8 %). At the end of season, in this study (Fredberg and Bolvig, 2002), US normalization was observed in some athletes, whereas in others, normal at baseline, signs of degeneration were found. In our group, none of degenerated tendons improved, while 3 athletes developed signs of tendinopathy. The comparison, however, is misleading, considering that the main criteria for the diagnosis of degeneration were tendon thickness in Fredberg's study (Fredberg and Bolvig, 2002), and structural abnormalities in our study. Moreover, the discrepancies can be explained by the playing characteristics, and by the demonstration that the exercise intensities are higher in futsal than those found in competitive soccer athletes (Castagna et al., 2009). In our cohort, the main risk factor related to tendon damage was the number of years spent in playing futsal; at a lesser extent, the age was found relevant. Another feature that must be underlined is the frequent observation of neovessels, found in ten tendons (8 subjects, 2 with bilateral tendinopathy). Neovessels ingrowth in tendinopathies is dependent by a hypoxic environment, with subsequent production of Vascular Endothelial Growth Factor (Abate et al., 2009). In futsal, the hypoxia contribution may be enhanced. Indeed, the analysis of activities during the game shows the existence of sprint bouts sequences (3 – 4 bouts) with very short recovery time (20 – 30 sec of lower intensity), anaerobic metabolism and high levels of lactate production (Castagna et al., 2008).

The relevance of asymptomatic tendinopathies in athletes is well known because, in most cases, tendon ruptures may occur without warning symptoms, but only when tendinopathic changes are present. When symptoms develop, the athlete is warned and therefore he should avoid further overload.

In conclusion, this preliminary study shows a high prevalence of tendinopathies in futsal professional athletes, frequently associated with neovascularisation.

Strengths of this study are the accurate US examination and the homogeneity of players evaluated. However, the small number of subjects has to be considered an important limitation and therefore our findings must be confirmed on larger samples, both in professional and amateur players of different ages.

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