

**Original Article**

**The injury prevention program WTA functional primitive movement in professional football players: A case study**

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**Abstract:**

The aim of this study is analyze the importance of prevention program, Functional Primitive Movement WTA, to reduce training and match incidence injuries every 1000h in professional football players participants to Italian 3rd Division Championship (Serie C) during season 2018-2019. This program is based on dynamic movement to activate muscles kinetics chains. Infact this muscle activation it allows to have better physical efficiency during the training (e.g. aerobic and anaerobic training), because there is a better muscles stretching than it activates muscles chains. Infact 30% of strength of a muscle is directed by the fascia (chain) which is fundamental to provide the intermuscular coordination necessary to recruit (for functional groups) the force itself. Method: Twenty five (n=25) professional soccer players included goalkeeper (GK) take part in this study (age 26.1±4.5; body weight 73.6±6.3 Kg; height 182±5.7 cm; fat mass 7.3±4.8%). They have been analyzed during 11 months, where they played 317 practice and 43 official matches (38 championship + 5 Italy cup). Conclusion: This case study has allowed us to highlight how this preventive work method allows to significantly reduce the occurrence of muscle and joint injuries caused by indirect trauma, if applied consistently during the course of the sporting season.

**Key words:** match performance, prevention program, injuries, training, wta functional primitive movement

**Introduction**

Soccer is an intermittent sport characterized by about 1200 acyclical and unpredictable changes in activity (each lasting from 3 to 5 s) involving, among others, 30 to 40 sprints, more than 700 turns and 30 to 40 tackles and jumps. This team sport involves periods of high-intensity activity, interspersed with lower intensity actions, as well as technical and tactical components (Sparkes et al., 2018). Recent studies have pointed out that soccer players cover between 8000 m and 14000 m during a match (Aguiar et al., 2012) showing that several physical skills such as running, kicking, dribbling and tackling can affect soccer player's performance. The prevention program is an important part of training, in all part of season (pre-season, in season, out season), because a professional players they must be ready to perform at high level: good health is a good performance. The myofascial system is the basis of this prevention and training program: the myofascial chains are organizations of muscles in sequence joined together in a tight manner by the fascial tissue that surrounds them and merges between them. It is this connective tissue that anatomically highlights the existence of functional relationships between the various body districts. The chains are neurological connections: muscles that move following sequences organized by the central nervous system. The chains start from the head (eyes) and reach the hands and feet and the other way around start at the ends and reach the head (eyes). The chains must be well balanced between them (agonists, antagonists, synergists). The chains are neurological mechanisms so if they do not control the bilaterality we will have compensations (incorrect postural alterations) towards the side or the portion of the body that we use most. They carry around problems if they are not activated correctly, they are 12: front, back, right side, left side, medial right for the limbs, medial left for the limbs, medial front for the trunk, medial back for the trunk, posterior lateral spiral, posterior medial spiral, front lateral spiral and front medial spiral. In fact 30% of strength of a muscle is directed by the fascia (chain) which is fundamental to provide the intermuscular coordination necessary to recruit (for functional groups) the force itself. The fascial tissue is a particular and complex type of connective tissue that is extremely specialized to perform different tasks, as far as movement is concerned there are essentially two: connect different muscles in neuro-motor sequences of movement, allowing global movements and with its stretching or its shortening caused by the movement of the body segments it constantly informs the nervous system on how the subject is moving in space, both in terms of direction and speed. (Raiola, 2017, Raiola et al., 2017, Gaetano, Rago, 2014, Raiola, D'Isanto 2016, Coelho et al. 2010). In fact when change a coaches during a season there are an improvement in injuries, in a study of professional players (Donmez et al. 2018), they have analysed coach replacement and relation with injury rate.

Muscle injuries are the most common complaints in sports medicine practice, and noncontact muscle strain injuries are usually seen in sport events involving high-speed sprinting, jumping, kicking, and rapid changes of direction, such as football. These types of injuries account for more than one-third of all time-loss football injuries and lead to significant losses in playing time among elite football players. The epidemiology of muscle injury has been extensively researched during international football tournaments and European football season, and the incidence and severity of football-related injuries have been found to differ considerably between professional leagues in different countries. Thus, we sought to evaluate whether coach dismissal, which results in changes in training methods, was linked to rates of skeletal muscle injury.

### Materials and Methods

Twenty five (n=25) professional soccer players included goalkeeper (GK) take part in this study (age 26.1±4.5; body weight 73.6±6.3 Kg; height 182±5.7 cm; fat mass 7.3±4.8%). They have been analyzed during 11 months, where they played 317 practice and 43 official matches (38 championship + 5 Italy cup). All athletes are elite players by Italian football championship. In order to be included in the study subjects had to 1) ensure regular participation in all the training sessions, 2) have competed regularly during the previous competitive season, and 3) possess medical clearance. Before entering the study, participants were fully informed about the study aims and procedures, and they provided written informed consent before the testing procedure. The study protocol was conformed to the code of Ethics of the World Medical Association (Declaration of Helsinki). The professional soccer team trained for approximately 14h five times per week (always on Monday, Tuesday, Wednesday, Thursday and Friday) plus the official match played on Saturday or Sunday. The study was conducted during the competitive season 2018-2019 (i.e. from July to June) and we examined and recorded during this period, 43 matches in Serie C (Italian 3<sup>rd</sup> division).

### Equipment

The players physical activity during each training session was monitored using set and repetition for each primitive movement exercise. Each player had a mat on which to perform the proposed exercises. This prevention program expected free body exercises on the ground (e.g gym surface or pitch surface).

### Data Analysis

The protocol was characterized by WTA functional primitive prevention program 2 times for week from July to October, before and after training, about 47 sessions (1018 minutes) and there weren't muscle injuries above 14 days (strain and tear). From November to March, this program was reduced, because the first coach was sacked and arrived a new coach and prevention program was reduced about 1 time for 2-3 weeks, 10 sessions (160 minutes). In this part of season indirect muscle injuries are increased significantly respect to first part of season. In third part of season, return back the first coach, because the second coach was sacked. Restart functional primitive program for 7 weeks, 1-2 times for week, 10 sessions (160 minutes) and in this period not have muscles injuries. Functional primitive training has as its main purpose to prepare muscle chains with joint mobility exercise. During entire season, total incidence injury it was 9.1/1000h, training incidence injury it was 4.1/1000h and match incidence injury it was 35.9/1000h, in line with UEFA and FIFA data on the incidence injury. Regarding muscle injuries (strain and tear) from July to October, incidence injury it was 0/1000h, from half October to March it was 0.85/1000h (with second Coach occurred 5 muscle strain and 3 elongations). At last from end of March to June muscle incidence injury it was 0.2/1000h (with return back a first coach occurred 2 muscle fatigue, no lesion) (Tab 1).

### Statistical Analysis

We analyzed variables with d-Cohen (effect size; ES), to compare between 2 different part of season. And Pearson's correlation coefficient (r). An alpha level of  $p < 0.05$  was chosen. The statistical analyses were performed with SPSS (SPSS, Inc., Chicago, IL, USA). Data are presented as means ± standard deviation. Effect size dimension is low from 0 to 0.4, moderate from 0.5 to 0.6 and large from 0.7 to 1.0.

### Results

Analyzing the data, in 2 different part of season, absences due to injury in the first part and last part of season (with a same head coach) are correlated with WTA prevention program ( $r=0.96$ ). Infact with this joint mobility exercise the average absence per match is 2.3 players for game. After this period, with a second coach, that which did not continue the prevention program constantly, injuries improve significantly ( $p < 0.05$ ; ES:0.91) about 32.1% respect to first and last part, with an inverse correlation ( $r = -0.49$ ), due to reduction (- 4.8%) and absence of preventive training [3,8]. The average players absence per match is 3.8 players per game, especially for muscle injuries over 14 days from moderate to severe entity. (Fig 1).

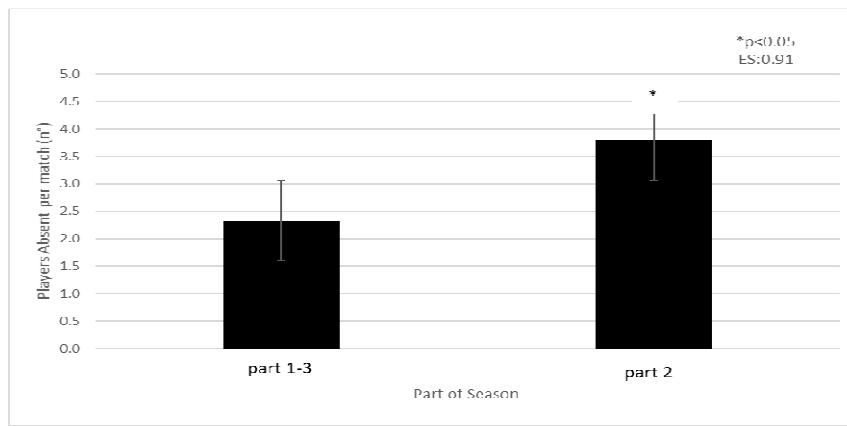


Fig.1. Differences between part 1-3 and 2 of season players absence per match ES: 0.91,  $p < 0.05^*$  (statistically significant)

In this situation an increase occurred from game based on ball possession before the training and a big number of training games at the end of the practice (25%). The protocol was characterized by WTA functional primitive prevention program 2 times for week from July to October, before and after training, about 47 sessions (1018 minutes) and there weren't muscle injuries above 14 days (strain and tear). The same condition from end of March to June 10 sessions (160 minutes), provide to reduce injuries ( $r = 0.96$ ;  $ES: 0.45$ ;  $P < 0.05$ ) see Fig 2.

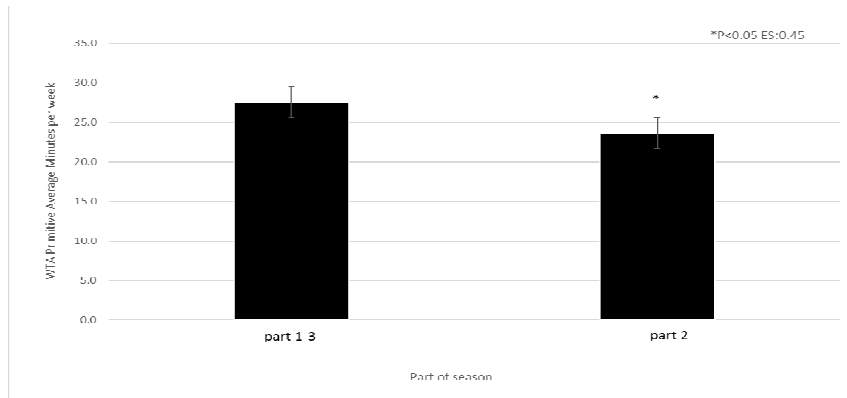


Fig.2 Differences between part 1-3 and 2 of season WTA average minutes per training ES: 0.45,  $p < 0.05^*$

Muscle injuries in the first and third part of season, period with WTA protocol, it was 2 (fatigue injury) as opposed to second part of season, period without WTA protocol, it was eight, 3 elongations and 5 muscle sprain, ( $p < 0.05$ ;  $ES: 1.84$ ), with a difference statistically significant see Fig.3.

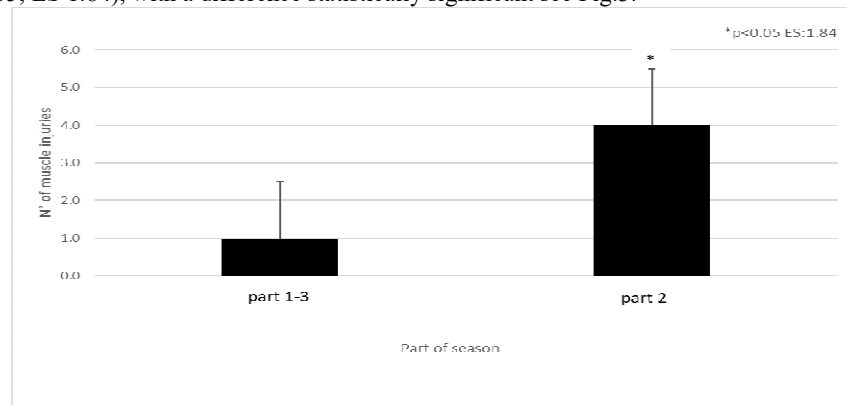


Fig.3 Differences between part 1-3 and 2 of season on number of muscles injuries ES: 1.84,  $p < 0.05^*$

During this season there was 12 muscle injuries distribute in 504.37 hours of exposure. The most of part of muscles injuries affected hamstring ( $n = 9$ , 75%), while the other districts most interested was adductor ( $n = 1$ , 8.3%), rectus femoris ( $n = 1$ , 8.3%), calf ( $n = 1$ , 8.3%). All injuries have occurred in second part of season, when WTA program has been suspended. Injuries were grouped according to muscle injury degree according to the

classical MRI-based classification system. The most common diagnosis was level 1A (n=4, 33.3%), level 3A (n=3, 25%), level 3B (n=5, 41.7%), the average loss time for practice is 12-25 days. Level of injuries respect collecting data e procedure of ISMUL T (Italian Society of Muscles Ligaments and Tendon, Maffulli N. et al. 2014), see Fig.4.

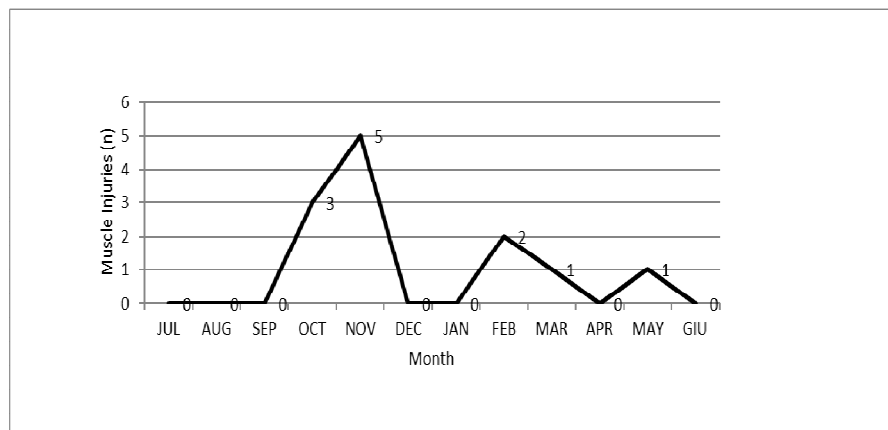


Fig.4. Muscle Injuries during entire season

### Conclusion

To establish effective prevention programs, it is essential to identify the risk factors associated with their occurrence. The results of this study suggest that maintaining consistency in coaching contributed to reducing the number of muscle strain injuries. Therefore, increased attentiveness on the part of trainers and medical teams during coaching transitions and to the impact of new training regimens is necessary to decrease injury risk in professional football. For example is important to perform before and after training, functional primitive movement WTA with joint mobility to prepare and activate muscles chains, in which the proprioceptors reside.

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