

Prevent Sprain Technology

Sport socks for the prevention of ankle sprains

Inventors:

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Physiotherapy Department
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<http://www.purecosocks.com/pt/>



Patent protection:

- International Application Number:
PCT/IB2018/054764 – CM Socks – Peúgas Carlos Maia Lda

Research centers:

- School of Health, Polytechnic Institute of Porto;
- Center for Rehabilitation Research;
- Center of Studies of Human Movement and Activity
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Ethical approval:

- Nº 3392 - The influence of different sport socks on postural control and performance;
- Researchers (Diogo C. F. Silva; Alexandre Lopes)

Director - Center for Rehabilitation Research	Researchers	
Rubim Santos, PhD	Diogo C. F. Silva, PhD	Alexandre Lopes, Esp

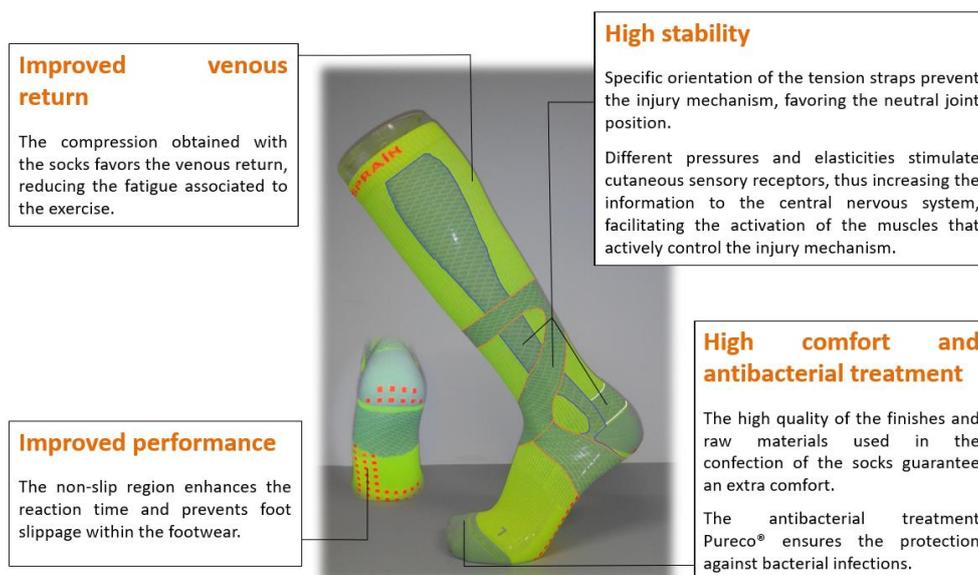
Abstract:

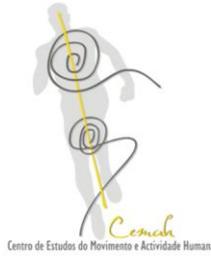
ABSTRACT SOCK FOR PREVENTING ANKLE INJURY - The present disclosure relates to a sock for preventing ankle injury of a subject, comprising a sock body which includes a leg section and a foot section, wherein the leg section comprises a fixation band comprising a first zone of high compression, configured to contour the transversal leg subject body, wherein the foot section comprises a second zone of high compression positioned to match the back of the ankle of the subject and configured to minimize subject adduction/abduction movements; a third zone of high compression that bounds to the subject leg section and foot section with a X-shape that begins in the fixation band and contours the plant of the foot section and the upper part of the foot section, configured to restrict the movement of subject plantar flexion, namely eversion/inversion movements, wherein the first zone and the second zone of high compression are bound by a vertical band, wherein such vertical band accompanies laterally the peroneal alignment path of the subject ending in the fixation band, wherein the remaining zones are low compression zones.

Promotional video:

<https://www.youtube.com/watch?v=NSRhm2f8APg>

<http://www.basebrandstudio.com/projetos/prevent-sprain-technology/>





Importance of this Innovation:

The importance of intervening in the prevention of ankle sprain is supported by studies that place this type of injury as the most frequent in several individual and collective sports, which represent 80 to 100% of all injuries in this anatomical region in some sports.

Up to 650,000 ankle injuries can occur in a single country in Europe (Netherlands), with incidence rates of 1.5-7 per 1000 person-year in the European population in general.

It is also an injury with a high recurrence rate, and in about 40% of cases it may lead to Chronic Ankle Instability.

Its prevalence is of concern in Europe, but also in the rest of the world, regardless of age, sex and competitive level.

The socioeconomic impact on health systems is enormous, because each injury can reach values in the range of 360,60 € to 10,949.00 €, which multiplied by the total number of injuries can exceed 234 million euros per year.

Ankle sprain as a health problem has prevention as the best possible solution. Since preventive policies best serve the interests of general society, it is essential to focus on methods of simple application, transversal to the entire world population, that promote individual autonomy, foster an active lifestyle and improve the quality of life.

Thus, the ease of implementation of this preventive method in sports communities and in the general population, regardless of age, physical activity level or gender, makes this prevention method the perfect vehicle to benefit the largest number of people in the world.

Because it is such a frequent injury, any effective method of reducing the risk of injury will ultimately benefit thousands of people.

The fact that the socks are a piece of clothing essential to sports practice promotes adherence to the preventive program, since the user will hardly forget it. The same does not happen with the other available methods (ankle bandages and ankle supports) which, as an "additional" part of the sportswear, is often not added to the sports bag by forgetfulness.

These new socks will allow the user to maintain the same levels of sensitivity and/or perception to contact with the ball, a factor of extreme importance in sports such as soccer and futsal. On the other hand, the existing solutions, "ankle bandages + conventional socks" or "Ankle supports + conventional socks", reduce this sensitivity and/or perception, impairing the performance, namely of the assertiveness of the pass. When the athlete associates a preventive method to performance reduction, often lead to the poor adhesion to that preventive method. With these new socks solution, this problem does not arise.

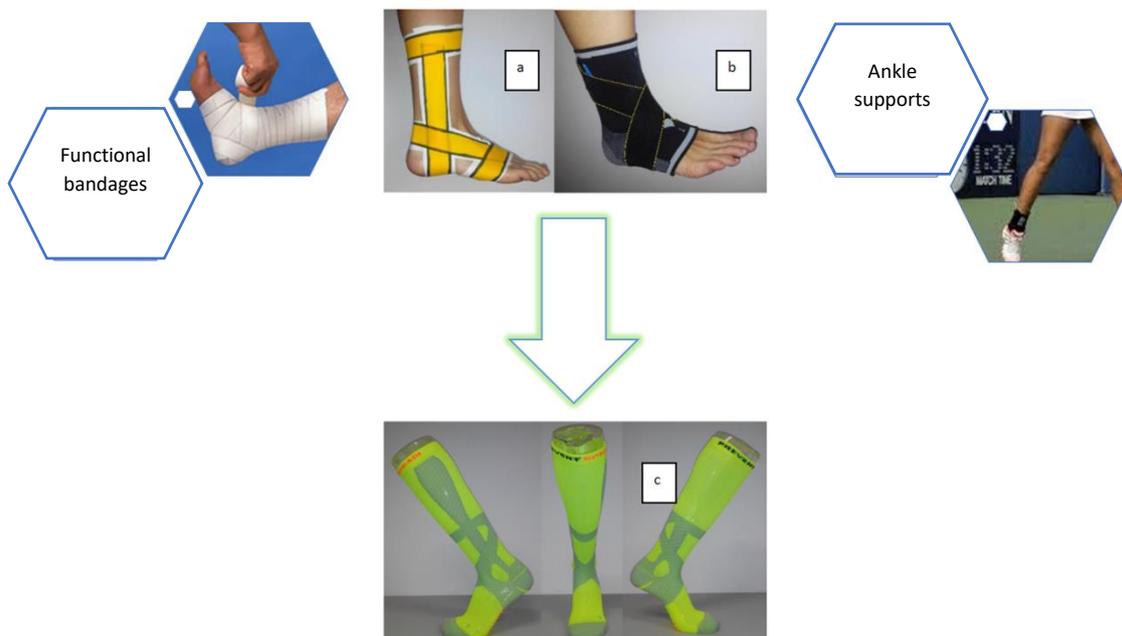
In the economic point of view, expressed in the costs of acquiring sports equipment by the athlete or club, this new solution is intended to be advantageous since it is reusable (in contrast

to functional bandages) and is part of the wearer's clothing, not appearing as an additional piece to the sportswear. Thus, the athlete / club would need to purchase only a sock, rather than buying conventional socks and additionally ankle supports.

Aware of the urgent premise of avoiding waste and encouraging reuse, these socks are a more environmentally friendly solution as they are a reusable prevention method. On the other hand, solutions such as functional bandages that do not allow their reuse and that use glues in their bands are completely disposable and nontransferable, which does not allow them to be a sustainable environmental solution.

These new socks will help solve the health and socioeconomic problems associated with this injury.

It is innovative concept will be incorporating in a single piece of clothing (socks), the theoretical foundations and characteristics of two methods widely used in the prevention of this injury (Ankle Supports and Functional bandages).



Product quality control:

Compression control:

Pressure measuring device – MST MK V, from, Switzerland



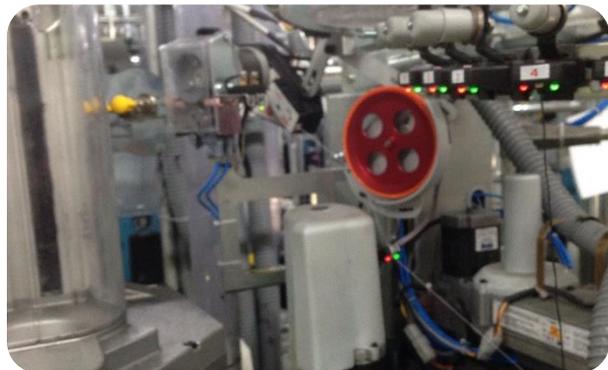
Elasticity control:

Socks Stretcher - Electric Stretch Tester from Italy



Fiber tension control:

Tensiometer



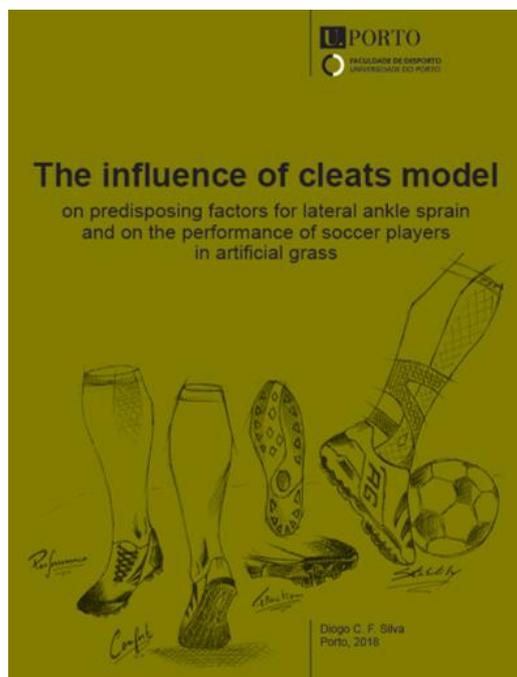
All these devices allow the socks to maintain high standards of quality. We only can guarantee that the characteristics of the socks remain the same throughout the production with all these measuring instruments.



Escola Superior de Saúde

Scientific recognition:

Integrated in a **doctoral thesis** in sports physiotherapy – Faculty of Sports, University of Porto (2018)



International Scientific Congress – School of Health, Polytechnic Institute of Lisbon (2018)



CERTIFICADO

Certifica-se que o Diogo Silva foi orador convidado com a apresentação intitulada *Prevenção da entorse do tornozelo: passado, presente e futuro - Prevent Sprain Technology* nas IV Jornadas de Ortoprotesia da ESTeSL, promovidas pela Escola Superior de Tecnologia da Saúde de Lisboa (ESTeSL), no dia 2 de junho de 2018, no auditório da ESTeSL, conforme programa no verso.

Lisboa, 2 de junho de 2018

A Presidente da ESTeSL

Prof.ª Coordenadora Anabela Graça

Study results:

Quantitative pilot study

Introduction:

The need for preventive measures for ankle sprain is supported by studies that place this type of injury as the most frequent in several sports and in non-athlete populations, representing 80 to 100% of all injuries in this anatomical region in some sports (Fong 2007).

Aim: To evaluate the effect of two sports socks on postural control.

Methodology:

Sample: 2 amateur soccer (♂) and basquetebol (♀) players aged 21, without chronic ankle instability.

Experimental procedures: 3 series of 30 seconds in unipodal support on unstable platform (Biodex Balance System), with each of the models of socks. The order in which the socks were tested was randomized.

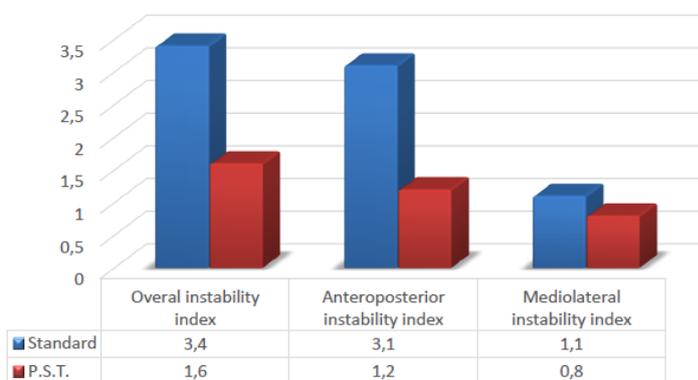
Results:



■ Standard

■ P.S.T.

Instability level
Standard socks vs Prevent Sprain Technology



Conclusion:

The Prevent Sprain Technology Socks reduced instability in the 30s unipodal support test, proving to be a promising option to ankle sprains prevention. Future studies should analyze the influence of these socks on more athletes with and without chronic ankle instability.

Qualitative field study

Introduction:

The need for preventive measures for ankle sprain is supported by studies that place this type of injury as the most frequent in several sports and in non-athlete populations, representing 80 to 100% of all injuries in this anatomical region in some sports (Fong 2007).

Aim: Qualitatively evaluate the stability, fatigue, performance and comfort of two sports socks.

Methodology:

Sample: 20 futsal (♂) and 18 volleyball (♂ ♀) players, aged 20 - 30

Procedures: During a training session the athletes used one standard sports socks on one leg and the P.S.T socks on the other. Subsequently, they answered the questionnaire about the subjective sensation of stability, fatigue, performance and comfort.

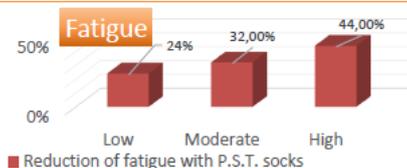


Results: *the results will be presented with reference to the standard socks



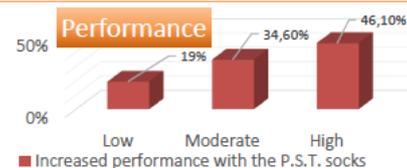
Conclusion:

100% of athletes reported that P.S.T. socks promoted a moderate or high increase in stability, compared to the standard sport socks.



Conclusion:

76% of athletes reported that P.S.T. socks promoted a moderate or high reduction of the fatigue sensation, compared to the standard sport socks.



Conclusion:

80.70% of athletes reported that P.S.T. socks promoted a moderate or high increase in performance, compared to the standard sport socks.



Conclusion:

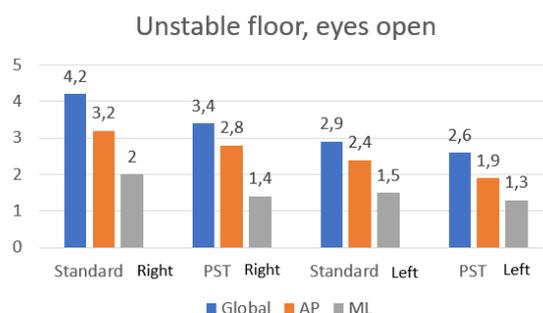
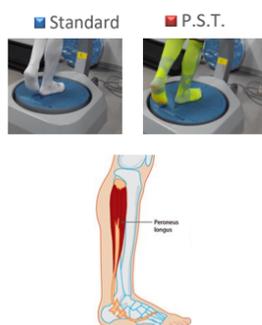
93.30% of athletes reported that P.S.T. socks promoted a moderate or high increase of comfort, compared to the standard sport socks.

Quantitative – series of cases studies

Methodology – series of case studies:

Sample: **1 Soccer amateur player** (♂) 38 years old, **with bilateral chronic ankle instability and a total long peroneal (LP)** (right ankle). **Experimental procedures:** 3 sets of 30 seconds in unipodal support on unstable platform (Biodex Balance System), with each of the models of socks.

Results:



Conclusion:

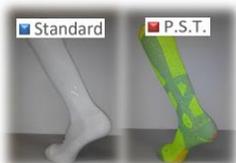
Prevent Sprain Technology **reduced instability** in the 30-second unipodal support test in both limbs, especially the right lower limb (with LP rupture).

Quantitative – series of cases studies

Methodology – series of case studies:

Sample: **1 Amateur kickbox** athlete (♂) 45 years old, **without chronic ankle instability**. **Experimental procedures:** Measurement of temperature at rest and after the **6 minutes walk test**. One limb with P.S.T socks and the other with a standard socks

Results:



Rest, without socks After 6 min walk test, Standard socks After 6 min walk test, PST

Conclusion:

The Prevent Sprain Technology socks **does not increase the temperature of the leg**, being lower than that registered with the standard socks.