

# MUSCULOSKELETAL COMPLAINTS AND PHYSIOTHERAPEUTIC PROCEDURES IN THE BRAZILIAN PARALYMPIC DELEGATION DURING THE PARALYMPIC ATHLETICS WORLD CHAMPIONSHIP IN 2011



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## ABSTRACT

**Introduction:** Athletics is an umbrella sport with high incidence of musculoskeletal injuries; however, the literature presents little information on injuries in Paralympics athletics. **Objective:** This study was to describe the profile of the musculoskeletal complaints, their anatomical locations, and physiotherapeutic resources used during the Paralympic Athletics World Championships in Christchurch in 2011. **Methods:** The Brazilian delegation included 34 athletes. Their musculoskeletal complaints, affected anatomical regions, and the physiotherapy resources used were daily recorded for all of the physiotherapy sessions. The sessions were held in the hotel that hosted the delegation and at the competition venue. **Results:** Out of the 34 athletes, 25 (73.5%) were treated at the Department of Physiotherapy. The main complaints were myalgia (38.4%), followed by arthralgia (23%). The region of the body with the most complaints was the thigh ( $n = 8$ , 30.7%), followed by the knee ( $n = 6$ , 23%). A total of 428 physiotherapy sessions were performed. At the hotel, the mostly used therapeutic approach was the ultrasound (35.1%), followed by TENS (31.2%) and cryotherapy (23.3%). At the competition venue, the mostly used therapeutic approach was cryotherapy (44.1%), followed by massage (37.2%). **Conclusion:** The results of this study contribute to a better understanding of the major injuries in this sport and help to develop programs aimed for injury prevention.

**Keywords:** athletic injuries, athletic performance, physiotherapy.

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## INTRODUCTION

The Paralympic sports have rapidly evolved over the last year, as well as the competitive level of their athletes, and this fact has been related with the increase of incidence of musculoskeletal injuries<sup>1,2</sup>.

Among the sports modalities, we can highlight athletics due to its diversity of events, each one characterized by the presence of specific training conditions and basic elements, such as running, jumping or throwing<sup>3</sup> and the physical abilities used. Athletics involves a wide variety of movement with diverse biomechanical characteristics, which may lead to the onset of common injuries and sometimes specific to the modality. Many studies reveal that practitioners of the athletics modality present musculoskeletal complaints during sports training and competitions<sup>4-6</sup>. Some studies conducted with Paralympic athletes demonstrate higher percentage of injuries on the lower limbs<sup>7-9</sup>. Vital *et al.*<sup>9</sup> found that the lower limbs (38.6%) were the most injured anatomical location in athletics during the World Paralympic Championship of 2002.

Athanasopoulos *et al.*<sup>10</sup> described the physiotherapy services performed during the Olympic Games of 2004, and found out that the athletics modality was the one which presented the most injuries, representing 51.1% of the services performed by the physiotherapy sector during the competition.

The physiotherapy sector, together with the medical department,

are the ones to first offer help to the injured athlete. The purpose is to perform a complete evaluation, leading into consideration the signs and symptoms reported by the athlete, allowing hence the identification of severe injuries in their initial stages<sup>11</sup>. The physiotherapist is a part of the medical team since the Paralympic games in Barcelona in 1992<sup>12</sup>, being of great relevance in the rehabilitation process of athletes with disabilities<sup>13</sup>. Some therapeutic modalities used by the physiotherapist aid in the healing process and consequently in the process of returning as fast as possible to the sport<sup>11</sup>.

However, until the present moment, little information in the literature about the main types of musculoskeletal injuries in the Paralympic athletics modality<sup>9</sup>, is available and no research about the main physiotherapeutic procedures used has been found. Therefore, this study has the aim to present the profile of the musculoskeletal complaints, their anatomical localization as well as physiotherapeutic procedures performed in the physiotherapy department of the Brazilian Delegation during the Christchurch Paralympic World Athletics Games in 2011.

## METHODS

### Participants

All the followed athletes were official members of the Brazilian Paralympic Athletics Delegation, recruited by the Brazilian Paralympic Committee (CPB) to participate in the Christchurch Paralympic

Athletics World Games in January, 2011. The Athletics World Games are held every four years and are organized by the International Paralympic Committee. The Brazilian Delegation had a total of 34 athletes (28 men and six women) who competed in the track and field events. Out of these, 10 were guide athletes, 17 were disabled athletes and seven of them were visually-impaired athletes.

This research was approved by the Ethics Committee of the Federal University of São Paulo (CEP nº 0294/11) and conducted according to the Resolution 196/96 of the National Health Board. All athletes signed a consent form agreeing on participating in the research.

## Procedures

All the treatments performed by the physiotherapy department of the CPB were recorded. The services were daily recorded concerning complaint, affected location physiotherapeutic resource used. All the athletes were clinically evaluated by the CPB doctor before the physiotherapy treatment began. The Physiotherapy Sector was composed of two physiotherapists, and the services were performed at the hotel site in which the delegation was and in the area next to the athletics track on which the competition was held. The services were performed during the training period (acclimatization) and competitions period, between January 8<sup>th</sup> and 28<sup>th</sup> (21 days). The training period lasted 14 days (from January 8<sup>th</sup> to 21<sup>st</sup>), during which, the athletes performed two activity shifts. The physiotherapeutic service for the ones who needed it, was performed during the day shift. During seven competition days (from January 22<sup>nd</sup> to 28<sup>th</sup>), the athletes received physiotherapeutic assistance in the competition venue during the two competition periods (morning and afternoon) and at the hotel in the afternoon and at night.

The collected data concerning the type of complaint, its location, and physiotherapeutic resource used were recorded and are presented in a descriptive manner, in percentage.

## RESULTS

The delegation was composed of 34 athletes (28 men and six women) who competed in the track (30 athletes) and field events (four athletes). The athletes presented age mean of  $28.9 \pm 6.3$  years, weight of  $66.1 \pm 9.4$  kg and height of  $171.7 \pm 10.2$  cm.

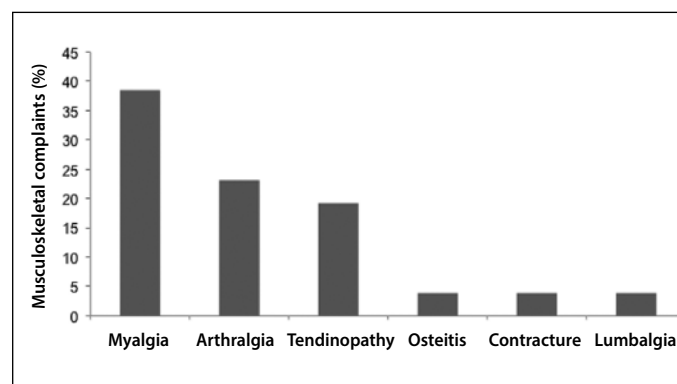
In the end, a total of 428 physiotherapeutic services were performed, out of which, 258 at the hotel premises and 170 at the athletics competition venue (table 1), with mean of 20 services a day.

Out of the 34 athletes, 25 (73.5%) needed physiotherapeutic service. The majority of the musculoskeletal complaints occurred in the first seven days ( $n = 20$ , 83.3%). The main musculoskeletal complaints were myalgias (38.4%), followed by arthralgias (23%) and tendinopathies (19.2%) (figure 1).

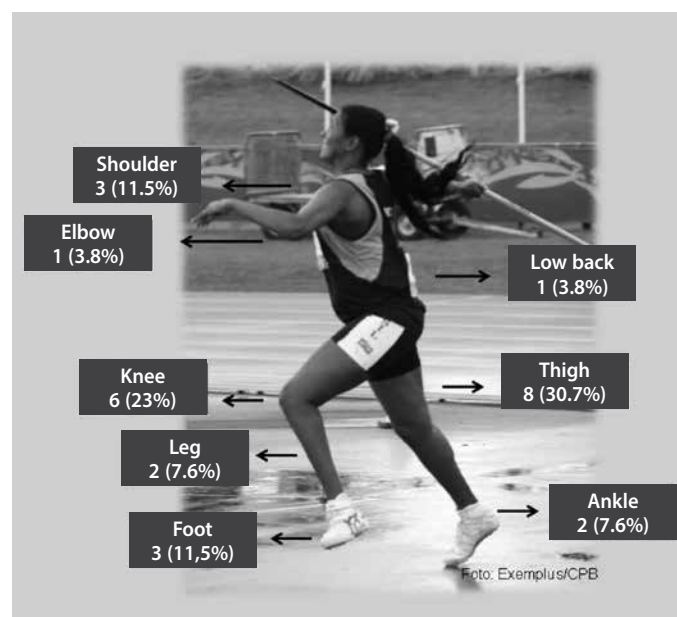
The most injured anatomical locations were the thigh ( $n = 8$ ; 30.7%), followed by the knee ( $n = 6$ ; 23%), the foot ( $n = 3$ ; 11.5%) and the shoulder ( $n = 3$ ; 11.5%) (figure 2). At the hotel, the most used therapeutic resource was the ultrasound (35.1%), followed by TENS (31.2%) and cryotherapy (23.3%) (figure 3). At the competition venue, the therapeutic resource which prevailed was cryotherapy (44.1%), followed by massotherapy (37.2%) and therapeutic bandaging (11.6%) (figure 4). No athlete was away from competition due to the musculoskeletal complaints.

**Table 1.** Number of physiotherapy services performed in the training period (14 days) and competition period (seven days).

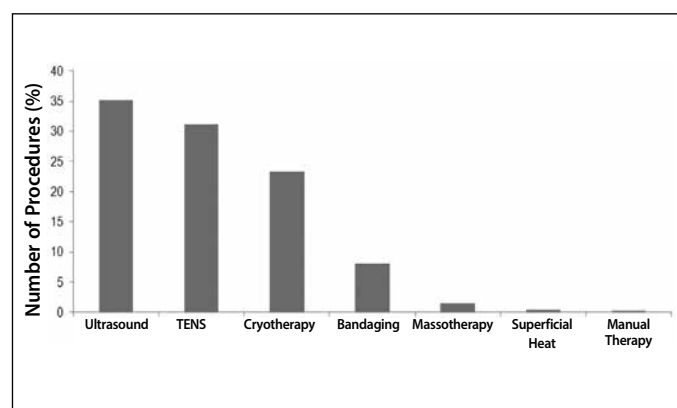
Number of services	Hotel	Competition venue	Total
Training period	173	112	285
Competition period	85	58	143
Total in the two periods	258	170	428



**Figure 1.** Percentage of musculoskeletal complaints.



**Figure 2.** Percentage of the musculoskeletal complaints per anatomical location.



**Figure 3.** Therapeutic modalities used in the services at the hotel.

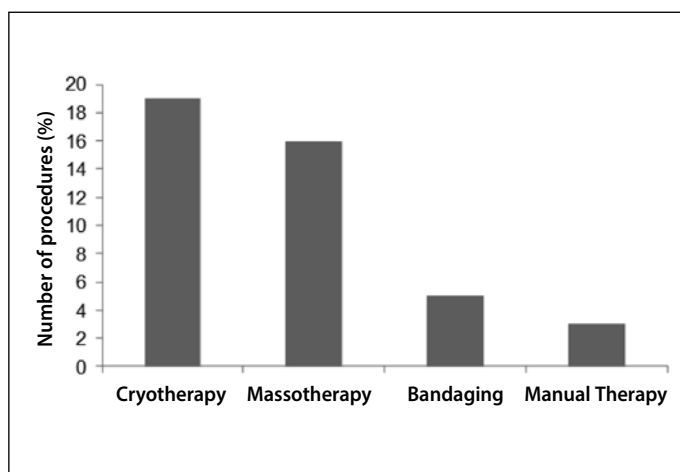


Figure 4. Therapeutic modalities used in the services in the track and field competition venue.

## DISCUSSION

The present study is the first to analyze in detail the numbers of physiotherapeutic services, the used procedures, the types of injury and their anatomical localization in an international competition of Paralympic athletics. In the Paralympic Athletics World Games held in Christchurch (New Zealand), Brazil was third place in number of medals, behind China and England (International Paralympic Committee, 2011)<sup>14</sup>. In the Paralympic Athletics World Games in 2006, held in Assen (Holand), Brazil had finished its participation in 17<sup>th</sup> place. This new classification of the Brazilian team demonstrates the evolution of the athletes and their improvement in competitive level, reflecting the increasing encouragement from the Brazilian Paralympic Committee concerning training conditions, medical, physiotherapeutic and physiological evaluations which the athletes have received.

However, the highly competitive level of the athletes triggers the onset of injuries, due to the higher exposure to stress agents and training repetition<sup>6,15-17</sup>.

In the present study, it can be observed that the majority of the athletes (73.5%) of the Brazilian delegation presented musculoskeletal complaints. The Paralympic athletics modality, despite the absence of physical contact among competitors, is characterized by a set of technical elements which directly influence on the motor control and biomechanics of the athletes, favoring the onset of a high number of injuries. These injuries are not only attributed to characteristics specific to the sport itself, but also suffer influence of the peculiarities of the Paralympic sport, such as use of orthoses and prostheses<sup>9</sup>.

The most frequent injuries found in the present study were myalgias, followed by arthralgias and tendinopathies. These data agree with the ones from other studies which investigated the incidence of injuries in Brazilian elite athletics<sup>16</sup>. Some studies in the literature conducted with Olympic athletes reported that the most frequent sports injuries in athletics are the musculoskeletal ones<sup>4-6</sup>.

Concerning anatomical localization, in the present study we found that the most frequent complaints were in the thigh (30.7%) and knee regions (23%). These data corroborate the results mentioned by Laurino *et al.*<sup>1</sup>, who demonstrated in their investigation

with Olympic athletes, that injuries on the thigh were the most frequent, with 53.3% of the cases, followed by the knee with 17.5%, upper limb and trunk with 11.7%, ankle and foot with 9.1% and leg with 8.3%. Laurino and Pochini<sup>18</sup>, who reported in their work with 95 Olympic athletes, incidence of 27.7% of injuries on the legs followed by the thigh (21.5%), knee (16.2%), foot (14.6%), ankle (7.3%), torso/pelvis and hip (13%).

According to Pastre *et al.*<sup>16</sup>, such fact may be explained by the higher demand applied to the lower limbs, when compared with other regions, especially because they were athletes who perform velocity and muscle explosion events. This fact is corroborated by many authors, who have identified the activities which require explosive movements as being the ones which cause the most injuries, as is the case of athletics<sup>1,19</sup>. This situation may be explained, especially by the excessive biomechanical demands, either of the joints or muscle groups which involve the mechanism used in athletics<sup>20</sup>.

The injuries caused by the sport in the present study occurred both in training and competition; however, the highest prevalence of complaints was on the first seven days (83.3%), in the training period and only 16.7% occurred during competition. According to D'Souza<sup>5</sup>, who investigated athletics practitioners of many competition levels, it was observed that the majority of the injuries occurred in the training period (60%) and 20% in the competition period, information which is in agreement with our research.

Concerning physiotherapy, a total of 428 services were performed, out of which 258 at the hotel premises and 170 at the athletics competition venue, with daily mean of 20 services (table 1), being this number due to the 73.5% of the athletes who needed physiotherapeutic treatment.

The therapeutic modalities used for rehabilitation of the sports injuries ranged according to the type of injury, and in the present study the most used therapeutic modality performed at the hotel was the ultrasound. This information corroborates the results found in the study by Lopes *et al.*<sup>21</sup>, who described about the physiotherapy service of the Brazilian delegation in the Pan-American Games in 2007, where the most used procedures were kinesiotherapy and ultrasound. These two modalities corresponded in the study by Lopes *et al.*<sup>21</sup> to approximately 40% of all the procedures, which may be attributed to the characteristics of the most frequent injuries and even more for being acute injuries. The ultrasound was also frequently used in the services of the Physiotherapy Department in the Polyclinic during the Olympic Games in Athens<sup>10</sup>.

Other physiotherapeutic procedures constantly used at the hotel were TENS and cryotherapy, since the majority of the athletes looked for the physiotherapy sector for analgesia procedures, also corroborating Lopes *et al.*<sup>21</sup>. On the other hand, the resources most used at the athletics competition venue were cryotherapy, massage and therapeutic bandaging.

According to Kettunen *et al.*<sup>22</sup>, competitive sports predispose the athletes to injury risks, causing concern both to trainers and athletes, since when an injury occurs the evolution process of systematic adaptations imposed by training is interrupted. Thus, the implementation of prevention and physiotherapy programs becomes necessary so that these injuries are minimized and efficiently and definitively solved in an attempt that the athlete rapidly and early return to his full capacity in competitive level.

## CONCLUSION

The results of this study contribute to better understand the main injuries in this sports modality, aiding in the development of programs aimed at their prevention.

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