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ARTIGO ORIGINAL

Epidemiology of sportive injuries in basketball wheelchair players

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ABSTRACT

Sportive activity for people with disabilities has been developed in order to be recreative and rehabilitative however, for some people, the sport rises a competitive aspiration. In such situations, an excessive number of training sessions and competitions may lead to an increased risk of sport injuries, which, according to the literature, is similar in disabled and able-bodied athletes. Objective: To identify the most frequent sport injuries of basketball wheelchair players. Patients and method: an interview was conducted with 26 male wheelchair basketball athletes, whose age varied from 18 to 47 years (mean: 27 years), and who participated in the state championship in 2003. Biodemographic data, as well as the etiology of the injury, weekly time spent with the sport and training activities, previous injuries during the sport practice and periods without sport practice due to those injuries, pain intensity evaluated by the visual analogue scale. Results: spinal cord injury corresponded to 42% of the patient, poliomielites to 31%, lower limb amputation to 27%. Sport practice varied form 2 months to 13 years, with an average of 6.5 years. Mean training periods was 21 hours weekly. Pain complaint was present in 54%of these athletes , being mostly localized in the upper limbs (79%). Only 6% of the sample had never had an injury during a game or training. Of the 11 spinal cord injured patients, 3 (27%) were not playing because of pressure sores (isquiadic, sacral and paravertebral). Among the musculosqueletal injuries, 75% were installed acutely, and 25% due to chronic repetitive efforts. Discussion: many studies comment about the increased incidence of musculoskeletal affections in wheelchair competitors, followed by pain in the upper extremity, mainly in the shoulder. Sprains and strains of metacarpophalangeal joints are the acute injuries and tendonitis are the repetitive strain injuries mostly described. The period of prevention from training in 52% of patients is less than 7 days, in 29% between 8 and 21 days, and in 19% of the athletes it is more than 22 days. Many authors mention that pressure sores prevent sport activities in spinal cord injured athletes. Our study showed similar results.

KEYWORDS

adapted sports, athletes injuries, decubitus ulcers, tendonitis, pain

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Introduction

After the II World War, when the number of persons with disabilities (PWD) reached a considerable number, it became necessary to create rehabilitation centers for the recovery and reintegration of these people into society[1]. In 1944, the National Spinal Injuries Center at Stoke, Mandeville, England, was created by Dr. Ludwig Guttman, who directed it. This center was a pioneer in the inclusion of sports activities in the rehabilitation treatment.

Sports activities for PWD were developed with the objective of being recreational and rehabilitational; however, the practice of sports arouses a competitive disposition in some individuals. The first competition for spinal cord-injured individuals, occurring as early as 1948, was called the "Stoke Mandeville Games for the Paralyzed". The first wheelchair basketball championship took place in 1949, promoted by the University of Illinois in the USA. In Brazil, sports activities for PWD were introduced in the 50's, after an epidemic of poliomyelitis and it has developed ever since.

The first Paralympics Games took place in Rome, 1960, and involved 400 athletes from 23 countries, competing in eight sports modalities. It is noteworthy the fact that it was only in Toronto (1976) that sports that did not require a wheelchair for its practice were included (such as for amputees and the visually impaired). In 1984 the term "Paralympics" was made official, and since then, this competition has been held every four years, in the same year and place of the Olympic Games, after the regular games have taken place[1,2]. The last Paralympics took place in Athens 2004 with 4,000 athletes from 143 countries, competing in 19 sports modalities.

Brazil has been participating in the Paralympics since Heidelberg,1972 when it did not win any medals, and it has shown a clear evolution, being in the 24th place in Sydney, 2000 with 22 medals (6 gold, 10 silver and 6 bronze) and 14th in Athens with 33 medals 914 gold, 12 silver and 7 bronze). The last Paralympics in Athens were the first participation, albeit with no medals, for the Brazilian men's wheelchair basketball team (participation was earned with the bronze medal won at the pre-paralympic games in Mar del Plata, Argentina in 2003.

Adaptations are often necessary for the practice of the adapted sports modalities for PWD, but they always follow the sports principles of the involved modality. Another situation is the creation of specific sports modalities to include certain physical deficiencies. Athletes who are eligible for participating in the competitions, according to the International Paralympics Committee are those who cannot compete in terms of equality with non-deficient athletes, because of the functional disadvantage due to permanent deficiency. The criteria of eligibility vary according to the sports modality practiced and the athlete's physical deficiency. In the case of wheelchair basketball, athletes with diverse types of physical deficiency, such as spinal cord injury, lower limb amputation and poliomyelitis sequelae, participate in the competitions.

With the objective of guarantying a fair competition in which athletes with different degrees of physical limitations could compete together, the functional classification was created in 1982 by Dr Horst Strohkendl, substituting the one used so far, which utilized the medical issue classification. This system is based on the observation of the athletes' movements and their skills during their presentations when practicing the adapted sports modality. This classification system was first validated for wheelchair basketball, and among the evaluated issues were the position and propelling of the wheelchair, dribbling, passing, shooting, and rebounding. Each player receives a score that varies from 1.0 to 4.5, and the total score of the athletes in the court must not exceed 14 points. The scores 1.5, 2.5 and 3.5 are used when the athlete presents intermediary characteristics to the classes[6].

The rules of adapted basketball are very similar to those of conventional basketball. The game consists of five players in each team, with the duration of four quarters of 10 minutes. In case of a tie game, as many 5-minute prorogations will be played as necessary until the game is no longer tied. The court has the same proportions as the one used in regular basketball, including the height of the hoop (3.05 m). the wheelchair must have some devices to ensure more safety and equality in the competition, and among them are: two large wheels located in the back, one or two smaller wheels located in the front and a small wheel in the back, which, when in contact with the ground, provides more safety to the player; the maximum height of the seat does not exceed 0.53m from the ground, and the footrest, 0.11m; when necessary, the use of a safety belt to hold the trunk to the back of the wheelchair and keep the legs close together. The use of ortheses or prostheses must be discriminated in the athlete's classification file[7].

The practice of adapted sports has abandoned the amateur characteristics and has achieved professionalism, with athletes seeking high effectiveness and great performances. In this situation, the competitive sports practice, with an excessive number of training sessions and competitions leads to an increase in the risk of trauma and sports-related injuries8. According to the literature, the risk of sports-related injuries for the population of disabled individuals who practice sports is similar to that observed among non-disabled athletes[9].

Objective

Our study aimed at identifying the most frequent sports-related injuries in wheelchair basketball athletes.

Patients and Methods

A directed interview was carried out with 26 male wheelchair basketball athletes, aged 18 to 47 years, with a mean age of 27 years. The inclusion criteria consisted of being male, presence of a permanent physical disability, absence of clinical complications (such as pressure ulcers) and being a participant of the state championship of wheelchair basketball of 2003 (athletes from the teams: AEDREHC, Águias and Magic Hands).

The information was obtained through a directed interview carried out by means of a questionnaire that included the athletes' personal information, etiology of the disability (spinal cord injury, lower limb amputation, poliomyelitis sequelae, others), how long

they had been practicing the sports modality, how many hours of practice a week they had, complaint of pain and its quantification through the analogical verbal scale (AVS), history of injuries during sports practice (training or competition) and duration of leave.

Among the lesions that can be caused by sports practice, the following are specified: contusion (injury caused by a direct trauma on the body leading to internal involvement, in general keeping the integrity of the skin; muscular rupture (solution of muscle continuity); muscle stretching (micro-lesion due to excessive stretching of the muscle) muscular cramps (muscular contractions in which the athlete cannot relax the muscle voluntarily); sprains (abrupt movement beyond the normal amplitude of the physiological joint movement); joint dislocation (loss of joint congruence); fracture (solution of bone continuity), tendonitis and bursitis, among others[11].

It is important to remember that factors such as pressure ulcers, urinary tract infections and autonomic dysreflexia (for injuries above T6) are also responsible for the leave of athletes with spinal cord injuries from trainings and competitions[1,4]. For those athletes who bear sequelae of poliomyelitis, it is worth mentioning that, in addition to the motor sequelae caused by the acute disease, they can develop the so-called "Post-Polio Syndrome", characterized by a picture of muscle weakness, premature fatigue and muscle and joint pain5 that can take place 25 to 40 years after the acute picture, which can interfere with the sports performance.

Results

Among the etiologies of physical impairments presented by the athletes, spinal cord injuries corresponded to 42% (11 athletes), paralysis due to poliomyelitis to 31% (8 athletes) and lower limb amputation to 27% (7 athletes). Of the athletes with poliomyelitis paralysis, 4 presented motor involvement in the lower limbs and 4 in the lower limbs and 1 upper limb. Of the amputees, only one athlete presented bilateral amputation of the lower limbs (transfemoral level).

The time they had been practicing sports varied from 2 months to 13 years, with a mean of 6.5 years. The duration of training sessions was similar for these athletes, even when compared by teams, being on average 21 hours per week.

Of these athletes, 54% of them referred pain, i.e., 14 of the 25 athletes presented some type of pain at the moment of the interview, being mostly in the upper limbs (79%). Regarding the etiology of these 14 athletes, 5 had spinal-cord injury (57% of the total number of spinal cord-injured athletes), 5 had poliomyelitis paralysis (62% of their total number) and 4 were amputees (57% of their total number). A more specific analysis of the pain complaint shows that:

• 6 (43%) referred shoulder pain of moderate intensity (AVS varying from 5-7 in a maximum of 10), with a chronic evolution (continuous and daily pain, which worsens at the end of the afternoon and after more vigorous training sessions, and duration varying from 5 months to 10 years);

• 3 (21%) referred wrist pain of slight to moderate intensity (AVS 1-5), with a chronic evolution (daily and continuous, with duration varying from 1 month to 6 years);

• 3 (21%) referred lumbar pain of moderate intensity (AVS 5-6) of chronic evolution (duration varying from 6 months to 3 years);

• 1 (0.007%) referred ongoing arm pain of moderate intensity (AVS 6) for 2 weeks;

• 1 (0.007%) referred ongoing hand pain of moderate intensity (AVS 5) for 2 years.

Of all the interviewed athletes, only 6 (23%) had never presented injury during a game or training session. The 20 athletes (77%) who presented sports-related injuries can be divided according to the physical deficiency: 7 spinal-cord injured (53% of their total number), 7 with poliomyelitis paralysis (87% of their total number) and 6 amputees (85% of their total number). Of the sports-related injuries referred, 75% were acute ones (due to trauma) and 25% were due to chronic evolution (caused by repetitive strain).

When discriminating the sports-related injuries affecting the athletes, it can be observed that:

• slight contusions were the most frequent ones (35%), affecting upper limbs (67%), lumbar region (22%) and lower limbs (11%); most cases did not lead to leave from the sports activities;

• fractures and joint dislocations (25%) usually caused leave from the sports activities for variable periods of time, depending on the severity (2 weeks to 18 months);

• sprains (15%) affected upper limbs (80%) and lower limbs (20%), and caused leave from sports activities for short periods of time and/or not causing leave from sports activities;

• injuries due to repetitive strain (25%) such as tendonitis and bursitis (wrist, elbow and shoulder) caused leave from sports activities for short periods of time and/or not causing leave from sports activities;

• other lesions: muscle stretching in the shoulder region of 1 athlete (40-day leave), contusion in the right eye in 1 athlete (no leave), spinal column rod breakage in 1 athlete (3-month leave), pressure ulcer in 3 athletes with spinal cord injury (1-week to 3-month leave).

Discussion

The practice of adapted sports can bring several benefits to the disabled individual, such as improvement in the motor coordination, trunk equilibrium, flexibility, muscular strength and cardiopulmonary function in comparison to the inactive ones, and especially social inclusion and improved self-esteem in these individuals3. Even with the observation of such benefits, exercise programs are rarely prescribed for this population, leading to the loss of physical conditioning due to inactivity.

Although the benefits brought on by sports practice are known, when it is practiced competitively one must be aware of the risk of injuries, acute ones and those caused by repetitive strain. In the specific case of wheelchair basketball, which is considered a contact sports[9], contrarily to what would be expected, the incidence of severe injuries such as fractures or joint dislocations is low[9,13].

For these wheelchair-bound athletes, the complaints of pain and chronic evolution injuries are the most frequent and occur in the upper limbs due to the overload caused by not only by the sports practice, but also in daily living and transference activites[10]. For this same reason, one might question if the occurrence of a sports-related injury that causes leave from the sports practice must also cause functional loss in daily living activities.

The sports-related injury is the one that occurs during sports practice, training or game, and can cause to athlete to lose part or all of the training or competition, or limit his or her athletic capacity for at least one day after its occurrence. The injuries can be acute due to a trauma (more frequently skin lacerations, contusions, muscle stretching and sprains, and less frequently, fractures and joint dislocations) or of chronic evolution due to repetitive strain (tendonitis and bursitis). The injury location seems to depend on the type of sports practiced and the athlete's physical deficiency.

The athletes were questioned regarding the complaint of pain at the moment of the interview and pain intensity was evaluated by a 10-point analogical-verbal scale (AVS), in which zero represents the absence of pain and 10 means unbearable pain, with the intensity of pain varying between these values[14]. Of the interviewed athletes, 54% of them presented pain complaint, being 79% in the upper limbs. When the pain complaint is discriminated among the athletes, 43% referred shoulder pain of moderate intensity (AVS 5-7) with chronic evolution, 21% referred wrist pain of slight to moderate intensity (AVS 1-5) with chronic evolution, and 21% referred lumbar pain of moderate intensity (AVS 5-6) with chronic evolution. There are many studies in literature that also report this high prevalence of muscular involvement in wheelchair-bound athletes, accompanied by pain complaint in the upper limbs, especially in the shoulder[12].

In the present study, 77% of these athletes had suffered sports-related injuries, either acute ones or due to repetitive strain, during training sessions or games. When the sports-related injuries are discriminated, it can be observed that 35% of them were slight contusions, often in the upper limbs, and most of the cases did not cause leave from the sports activities. Twenty-five percent of them were fractures and joint dislocations, which caused longer leaves, and another 25% were injuries due to repetitive strain such as tendonitis and bursitis (wrist, elbow, shoulder), and did not cause leave or caused short leaves from the sports activities. Of the 11 spinal cord-injured athletes, 3 (27%) presented leave due to pressure ulcer (ischial, sacrum and paravertebral regions), being the ones with the highest levels of spinal cord injury (T3, T6 and T10).

There is scarce literature on this subject, which show a moderate prevalence of spots-related injuries (66%) during the practice of wheelchair basketball, being most of the injuries in the upper limbs (74.5%) and occurring in acute forms in 57.7% of the times13. Metacarpal contusions and sprains are the most common acute injuries and tendonites are the most common among the repetitive strain-related injuries found in literature, with more severe injuries such as fractures and joint dislocations apparently having a lower incidence[9,13]. When the duration of leave from sports activities is expressed, literature shows that 52% lasts 7 days or less, 29% lasts 8 to 21 days, and 19% lasts more than 22 days9. Several authors have reported pressure ulcers as a factor of leave from sports activities, varying from 14%10 to 20%9 among the athletes with spinal cord injury. Similar aspects were demonstrated in the present study.

Conclusion

Sports-related injuries in wheelchair athletes are frequently observed, affecting mainly the upper limbs. The main types of injuries are caused by acute trauma, pain and repetitive strain. The prevention as well as the treatment of these injuries are equally important, as they can lead to the leave from sports activities and hinder the independence in daily living activities.

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