INJURIES IN TRACK AND FIELD
A TWO-YEAR FOLLOW-UP

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INTRODUCTION

- Modern Track and Field comprehends a wide variety of events as follows:
  - Sprints: 100m, 200m, 400m / Hurdles: 100/110m, 400m
  - Middle-distance: 800m, 1.500m, mile / Long-distance: 3.000m steeplechase, 5.000m, 10.000m, marathon
  - Jump events: high, long, triple and pole vault / Throwing events: javelin, shot put, discus, hammer
  - Combined events: decathlon and heptathlon
- Literature records incidences of injury in track and field athletes ranging from 17% to 76% and injury exposure rate ranging from 2.5 to 5.8 injuries/1.000 hours of training.
- High performance levels in elite sports demand specific athletic skills and training programs.
- Following athletes during a competitive season discloses important information leading to a better understanding of each athletic event.
- The purpose of this study was to describe the epidemiology of injuries among elite track and field athletes during two seasons and to establish the correlations between incidence of injury and the parameters of gender, age and performance level.

MATERIALS AND METHODS

- 46 track and field athletes, 31 (67.4%) male and 15 (32.6%) female from 6 different teams were randomly selected among an elite group defined by the top 10 performers for each event in the “Brazilian Track and Field Ranking”.
- Average age was 19±4 years (14 to 32 years).
- The athletes were followed prospectively during two years
- Athletes’ profiles (age, sex, gender, training hours/days), competitive performances and musculoskeletal injuries were recorded.
- Standard statistical methods: Student’s *t*-test and chi-square test. $P < 0.05$.

MATERIALS AND METHODS

- "Sport Performance Rate" (SPR) was defined to describe the athlete's performance level of each event during the season.
  - The index was based on the ratio between the athletes' best performance (SB) in the season and the best performance of the year in the national ranking (NR) established for age, gender and event.
  - SPR = NR/SB for track events
  - SPR = SB/NR for field and combined events

- Athlete's distribution according to "Sport Performance Rate" (SPR) groups represented by number of athletes (N) and percentage (%).

GROUPS	SPR	N	%
A	< 85%	8	20.5
B	85 – 90%	9	23.1
C	91 – 95%	8	20.5
D	> 95 %	14	35.9
	TOTAL	39	100

RESULTS

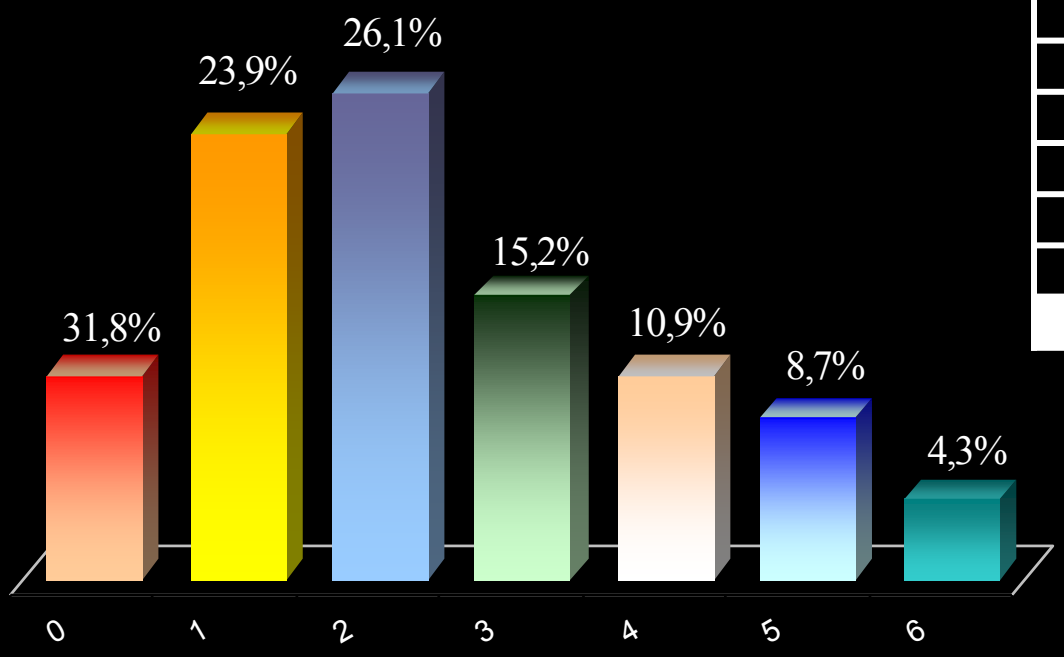
- 107 injuries among 41(89.1%) athletes, 29(93.5%) male and 12(80.0%) female.
- 2.6 injuries/athlete.
- 1.3 injuries/athlete/year.
- 1.5 injuries/athletes/1.000h of training.
- Injuries were prevalent during competitions 89(83.2%).
- Lower limbs were involved in 92(85.9%) cases.
- Surgical treatment was indicated for 7(6.5%) cases

RESULTS

Athlete's distribution according to the diagnosis in absolute numbers (N) and percentage (%)		
DIAGNOSIS	**N**	**%**
Hamstring injury	28	26.2
Patellar tendinopathy	12	11.2
Shin splint	11	10.3
Achilles tendinopathy	7	6.5
Ankle ligamentous injury	7	6.5
Knee ligamentous and/or meniscal injury	7	6.5
Tibial stress fracture	5	4.7
Rotator cuff injury	5	4.7
Other	25	23,3
TOTAL	**107**	**100.0**

RESULTS

Athlete's distribution according to the number of injuries in absolute numbers (N) and percentage (%).



NUMBER OF INJURIES	N
0	5
1	11
2	12
3	7
4	5
5	4
6	2
Total	46

RESULTS

Statistical analysis revealed no significant differences between the incidence of injuries and: (P<0,05)

- Ethnical groups (P= 0.635)
- Number of events (P=0.635)
- Sex (P = 0,311)
- Age (P= 0,157)
- Sport Performance Rate (P=0,441)

DISCUSSION

- To provide objective and reliable information on injury incidence in track and field we considered a target population and a strict injury definition.
- The incidence of musculoskeletal injuries in the studies by Lysholm Wiklander (65%), D'Souza (61%), Bennell Crossley (76%) and Laurino et al (75.7%), demonstrate similar rates and characterize track and field as a high-potential risk sport.
- Hamstrings injuries were prevalent in this group of elite track and field athletes like other studies. Hamstring tears do not result from direct trauma but rather are stretch induced injuries caused by a sudden forced lengthening occurring during a powerful contraction. The most common mechanism of injury is ballistic hip flexion during eccentric knee extension, a base biomechanical movement of most of track and field events.
- Every track and field event represent a different sport considering the biomechanics, athlete's skills and training methods. Further research needs to be carried out studying athletes' behavior in a specific event, comparing different risk factors (types of shoes, surfaces, implements, periodization, strength, techniques, biomechanics and rest).
- The high incidence of musculoskeletal injuries recorded in this group indicates that competitive track and field athletes are at high risk of injury during their career. Further studies, comparing elite and non-elite incidence rates are needed to answer this question.

REFERENCES

1. Ekstrand J, Gilquist J, Moller M, Oberg B, Liljedahl SO. Incidence of soccer injuries and their relation to training and team success. *Am J Sports Med* 1983; 11:63-7.
2. Watson DM, Dimartino PP. Incidence of injuries in high school track and field athletes and its relation to performance ability. *Am J Sports Med* 1987; 15:251-4.
3. Lysholm J, Wiklander J: Injuries in runners. *Am J Sports Med* 1987; 15:168-71.
4. Bennell KL, Crossley K. Musculoskeletal injuries in track and field: incidence, distribution and risk factors. *Aust J Sci Med Sports* 1996; 28:69-75.
5. D'Souza D. Track and field athletics injuries. A one-year survey. *Br Sports Med* 1994; 28:197-202.
6. Laurino CFS, Cohen M, Abdala R, Dias A, Mano K. Lesões músculo-esqueléticas no Atletismo. Rev Bras Ortop 2000; 35:364-8.
7. Laurino CFS, Pochini AC. Atletismo. In: Cohen M, Abdalla RJ. Lesões nos Esportes. São Paulo: Revinter; 2003. p. 688-713.
8. Laurino CFS, Alloza JFM, Oliveira ASB. Lesão Muscular – Supertreinamento. *Ars Curandi:* 1994; 6:46-60.
9. Johnson U: The multiply injured versus the first time injured athlete during rehabilitation: a comparison of nonphysical characteristics. *J Sports Rehabil Champaign (III)* 1996; 5:293-304.
10. Garrett WE, Califf JC, Bassett FH. Histochemical correlates of hamstring injuries. *Am J Sports Med* 1984; 12:98-102.
11. Heynen M.Hamstring Injuries in sprinting. *New Studies in Athletics-IAAF*. 2001; 16:43-48.
12. Yamamoto T: Relationship between hamstrings strains and leg muscle strength. *J Sports Med Phys Fitness* 1993; 33:194-9.
13. Proske U, Morgan DL, Brockett CL, Percival P. Identifying athletes at risk of hamstring strains and how to protect them. Clin Exp Pharmacol Physiol 2004; 31:546-50.
14. Monteleone, O.P.; Stress Fractures in the Athlete. *The Orthopaedic Clinics of North America* 1995; 26, 3, 423-32.
15. Shelboume, K.D.; Fisher D. A.; Rettig, A.C.; MeCarrolí, J.R. Stress fractures of the medial malleolus. *Am J Sports Med* 1988; 16, 1, 60-3.
16. Laurino, CFS; Miszputen, ML; Vieira, ELC. Fraturas por Estresse. In: Cohen M, Abdalla RJ, editores. Lesões nos Esportes, diagnóstico prevenção e tratamento. Ed.Revinter.2003b.640-55.
17. Silva, R T; De Bortoli A; Laurino, C F S; Abdalla, R J; Cohen, M. Sacral stress fracture: an unusual cause of low back pain in an amateur tennis player. *British Journal of Sports Medicine* 2006; 40:460-461.