

BRUNO TIROTTI SARAGIOTTO, PT, MSc¹ • TIÊ PARMA YAMATO, PT, MSc¹ • ALEXANDRE DIAS LOPES, PT, PhD¹

What Do Recreational Runners Think About Risk Factors for Running Injuries? A Descriptive Study of Their Beliefs and Opinions

Running is one of the most popular types of physical activity worldwide. The benefits attributed to recreational running include improvements in physical and mental health, weight control, stress reduction, and social participation.^{2,5,26} After starting to run on a regular basis, runners report changes in their lifestyles, including better eating habits, better sleep, and decreased intake of alcohol and tobacco. They also report that running makes

them feel happier, more relaxed, and energetic.^{2,8,9} However, training less or stopping can make some runners feel guilty, with greater irritability, less energy, and even signs of depression and addiction.^{2,8}

Despite the benefits of running, the number of running injuries reported in the literature is worrisome. The incidence and prevalence of running-related injuries have been reported to range between 19% and 92%,^{16,17,26} depending on the population studied and the definition of running-related injury.^{11,26} In general, running injuries are believed to have a multifactorial etiology and are commonly related to overuse (repetitive microtrauma that overloads the musculoskeletal structures).^{4,12} Some factors commonly associated with running injuries are a history of previous injuries and poor training habits, such as running greater weekly distances.^{26,31}

To create an effective strategy for prevention of sports injuries, Finch⁶ developed a framework that takes into account the behavioral aspects of the athletes, including their beliefs and opinions about injury prevention. This framework complements previous theoretical models based on the understanding of the injury etiology and its relationship to internal

- **STUDY DESIGN:** Qualitative study based on semi-structured interviews.
- **OBJECTIVES:** To describe the beliefs and opinions of runners about risk factors associated with running injuries.
- **BACKGROUND:** Despite the health benefits of running, a high prevalence of injury has been reported in runners. Preventive strategies for running injuries may be more successful with a better knowledge of runners' beliefs.
- **METHODS:** A semi-structured interview of recreational runners was based on the question, "What do you think can cause injuries in runners?" Analysis of the interviews was performed in 3 steps: (1) organizing the data into thematic units, (2) reading and reorganizing the data according to frequency of citation, and (3) interpreting and summarizing the data. The runner interviews were continued until no new beliefs and opinions of runners regarding injuries were being added to the data, indicating saturation of the topic.
- **RESULTS:** A total of 95 recreational runners (65 men, 30 women) between the ages of 19 and

71 years were interviewed. Of those interviewed, the average running experience was 5.5 years and approximately 45% had experienced a running-related injury in the past. The factors suggested by the runners were divided into extrinsic and intrinsic factors. The most cited extrinsic factors were "not stretching," "excess of training," "not warming up," "lack of strength," and "wearing the wrong shoes." For the intrinsic factors, the main terms cited were "not respecting the body's limitations" and "foot-type changes."

- **CONCLUSION:** Recreational runners mainly attributed injury to factors related to training, running shoes, and exceeding the body's limits. Knowing the factors identified in this study may contribute to the development of better educational strategies to prevent running injuries, as some of the runners' beliefs are not supported by the research literature. *J Orthop Sports Phys Ther* 2014;44(10):733-738. Epub 25 August 2014. doi:10.2519/jospt.2014.5710

- **KEY WORDS:** prevention, qualitative research, running, shoes

¹Masters and Doctoral Program in Physical Therapy, São Paulo Running Injury Group, Universidade Cidade de São Paulo, São Paulo, Brazil. This study was approved by the Research Ethics Committee of the Universidade Cidade de São Paulo (protocol 0084.0.186.000-11). The authors certify that they have no affiliations with or financial involvement in any organization or entity with a direct financial interest in the subject matter or materials discussed in the article. Address correspondence to Bruno Tirotti Saragiotto, Universidade Cidade de São Paulo, Rua Cesário Galeno, 448 Tatuapé, São Paulo, SP, Cep 03071-000 Brazil. E-mail: bruno.saragiotto@gmail.com ● Copyright ©2014 *Journal of Orthopaedic & Sports Physical Therapy*[®]

and external factors.^{19,27} The cognitive aspects related to running-related injuries may be directly related to a runner's behavior toward prevention of injuries. Understanding the runner's beliefs has the potential to contribute to the development of more effective prevention programs by taking into account the pre-existing beliefs of runners as well as the behavioral factors related to running injuries.

Further, the importance of investigating athletes' attitudes and beliefs has been reported in recently published studies^{18,29,30}; however, only a few studies have investigated the potential relationship between cognitive or behavioral factors and injuries in sports. A systematic review¹⁸ showed that out of 100 published injury-prevention studies, only 11 clearly used behavioral or social theories. A recent qualitative study²⁸ has suggested that the beliefs and opinions of athletes and coaches should be included in prevention programs to increase the effectiveness of these programs.

To our knowledge, no studies have investigated the beliefs of runners about running injuries. Thus, the aim of this study was to describe the beliefs and opinions of recreational runners about the risk factors associated with running injuries.

METHODS

Participants

WE CONDUCTED A QUALITATIVE study using semi-structured interviews. Recreational runners were recruited from different parks from the city of São Paulo, Brazil. The inclusion criteria were (1) running for at least 6 months, (2) running a minimum distance of 10 km per week, and (3) being 18 years of age or older. We designed the inclusion criteria to ensure that the participants had a minimum level of experience as runners. The sample size of this study was determined when interviews did not add new information on risk factors, leading to saturation of the theme

TABLE 1	CHARACTERISTICS OF THE PARTICIPANTS (N = 95)
Characteristic	Value
Age, y*	40.1 ± 12.6
Sex, n (%)	
Male	65 (68)
Female	30 (32)
Professional supervision (trainer or coach), n (%)	
Yes	32 (34)
No	63 (66)
Race participation, n (%)	
Yes	54 (57)
No	41 (43)
Number of training sessions per week*	3.7 ± 1.4
Weekly distance, km/wk*	34.9 ± 24.8
Experience, y*	5.5 ± 5.5
Injury at the moment of the interview, n (%)	
Yes	10 (11)
No	85 (89)
Previous injury, n (%)	
Yes	43 (45)
No	52 (55)

*Values are mean ± SD.

during the data analysis. This study was approved by the Research Ethics Committee of the Universidade Cidade de São Paulo, São Paulo, Brazil. All participants read and signed the consent form, and their rights were protected.

Data Collection

All interviews were conducted by the same interviewer (B.T.S.). The interviewer was trained to adopt a neutral position while conducting the semi-structured interview, so that the participant being interviewed could speak freely and contribute as much information as possible about the topic. Runners were interviewed until saturation of the theme was reached, which was determined when no new information emerged in the interviews. The semi-structured interview began with the question, "What do you think can cause injuries in runners?" The interviews were audiotaped using an Olympus VN-8100PC digital voice recorder (Olympus Imaging Corporation, Tokyo, Japan), and transcribed afterward

to a text document. Another researcher (T.P.Y.) compared all the transcribed interviews with the recorded audio material to confirm the accuracy of the transcriptions. Before the interviews, all participants filled out a form about personal data, training habits, professional supervision during training, and injury information (current and previous injuries). A running-related injury was considered as any pain or discomfort associated with running that caused a restriction on training or running activities. We also considered professional supervision as any supervision by a health professional (eg, trainer, coach, or physiotherapist) during individual or group training. No further investigations were performed related to the accuracy or diagnosis of the injury reported by the participants.

Data Analysis

A descriptive analysis of the characteristics of the participants was performed. Analysis of the interview transcripts was performed in 3 steps: (1) organization

TABLE 2

INTRINSIC FACTORS REPORTED
BY THE PARTICIPANTS

Category/Factor	Number of Citations
Personal characteristics	
Overweight	8
Genetic predisposition	5
Lack of experience	4
History of injury	2
Anatomic abnormality	2
Older age	2
Stress	1
Biomechanics/technique	
Foot-type changes	14
Poor posture during running	7
Wrong running technique	6
Running impact on the body	1
No foot-strike evaluation	1
Behavior	
Not respecting the body's limits	18
Lack of attention during running	3
Haste to train more	2
Fear of injury	2
Ignoring the pain	1
Hurrying to participate in races	1
Competitive running	1
Overprotection of injuries	1
Other	
Bad luck	1

of the transcribed data into thematic units (words or phrases that described the themes presented in the participants' answers); (2) data exploration, which involved the careful reading and organization of the data into categories (these categories were created according to the frequency of the thematic units identified in step 1); and (3) interpretation of the data and summarization. All authors approved the thematic units and categories created during the data analysis. After the data analysis, the categories were divided into intrinsic or extrinsic factors. Intrinsic factors were those related to the individual characteristics of the runners, such as sex, age, anthropometric characteristics, and behaviors. The extrinsic factors were those related to the environment, climate, equipment, and training.²⁰

RESULTS

A TOTAL OF 95 RUNNERS (65 MEN, 30 women) between the ages of 19 and 71 years were interviewed, leading to saturation of the topic, with no new themes emerging from the data. The characteristics of all participants are described in **TABLE 1**. Based on the data analysis, intrinsic factors were divided into 4 categories: personal characteristics, biomechanics/technique, behavior, and other. Extrinsic factors were also divided into 4 categories: running shoes, nutrition, training, and other.

For the intrinsic factors (**TABLE 2**), the category related to behavior was the most often cited by the runners. The most common term cited in this category was "not respecting the body's limitations." The category of biomechanics/technique

was the second most cited, with "foot-type changes" being the most quoted term. This category is related to alterations in the foot type that runners believe may cause injuries (eg, pronated, highly pronated).

For the extrinsic factors (**TABLE 3**), the majority of runners who were interviewed believed that training was the primary cause of injuries in runners. The most cited terms in this category were "not stretching," "excessive training," "not warming up," and "lack of strength." The extrinsic category with the second highest number of citations was running shoes, in which "wearing the wrong shoes for one's foot type" was the most cited theme.

DISCUSSION

THIS IS THE FIRST STUDY, TO OUR knowledge, to examine runners' beliefs regarding running-related injuries. The sample consisted of 95 recreational runners who were, on average, 40 years of age, predominantly men, had approximately 5 years of running experience, and ran on a regular basis (an average of 35 km per week). Additionally, almost half of these runners had sustained a previous running-related injury. The primary extrinsic factors mentioned were not stretching (before or after training [running]), excessive training (running), and wearing the wrong running shoes. The most frequently reported intrinsic factors were not respecting the body's limits and changes in foot type.

The interviewees mentioned "not stretching" as a primary factor associated with running injuries in this study. In the following quotation, we can understand the power of this belief in runners: "...I believe that stretching is the main cause of running injury ... when I run without stretching well before, I feel that I'm running differently and I get worried..." (subject 11). Clearly, runners believe that stretching before or after running may prevent injuries, despite the lack of scientific evidence to support this belief. A systematic review of randomized controlled

TABLE 3

**EXTRINSIC FACTORS REPORTED
BY THE PARTICIPANTS**

Category/Factor	Number of Citations
Running shoes	
Wearing the wrong shoes for foot type	22
Wearing the wrong shoes for running	8
Shoes without cushioning	4
Heel too low	1
Old shoes	1
Worn-down shoes	1
Low-quality running shoes	1
Nutrition	
Inadequate/unbalanced diet	20
Dietary supplements	1
Training	
Not stretching	31
Excessive training	28
Not warming up	20
Lack of strength	19
No professional supervision	17
Lack of physical fitness	11
Irregular training	9
Excessive speed/pace	7
Competitive training	4
Training year-round	4
Running uphill or downhill	4
Not following the program/orientation from the trainer/coach	4
Not stretching properly	4
Muscle fatigue	3
Sudden change in training intensity	3
Not resting	3
High weekly distance	2
Poor orientation from the trainer/coach	2
Training with advanced running groups	2
Not stopping when tired	2
Other	
Obstacles (street holes, stones, road conditions)	6
Participation in races	3
Falls	3
Running while listening to music	1

this conviction, which has become stronger over the years.¹⁰ Another explanation could be the belief that runners confuse warming up before exercise with stretching. The term *warm-up* is defined as a period of preparatory exercise to enhance subsequent competition or training.⁷ A systematic review reported that studies found warming up to be ineffective at reducing injury when it focused mainly on stretching, but studies that focused on warming up to increase body temperature did find a significant reduction in the risk of sport injury.⁷ Educational interventions are needed so that runners understand the differences between stretching exercises, which seem not to be effective in prevention, and warming up to increase the body's temperature preparatory to exercise, which may reduce injury risk.

Runners also expressed great concern about running shoes, as shown in the following report: "...I think if you do not have good shoes appropriate for your foot type, you will get injured, since you are wearing the wrong shoes..." (subject 21). Our findings show that many runners believe that an inappropriate shoe for running or their foot type may cause injuries. They also express concerns with lack of cushioning, the heel height, and excessive wear or usage time of the shoes. However, the few studies that have investigated the influence of shoes on running injuries show contrasting results with the runners' opinions. Nielsen et al,²¹ in a recent 1-year prospective cohort study, found no significant differences in running distance before occurrence of the first injury between different types of foot postures (highly supinated, supinated, pronated, and highly pronated) compared with neutral feet in novice runners using the same type of shoe. Three large-scale studies,¹³⁻¹⁵ performed with military personnel, showed no difference in injury risk between individuals who received motion-control, stability, or neutral shoes, based on their foot type, compared with those who received a stability shoe irrespective of their foot type. Another

trials³² on interventions to prevent running injuries concluded that stretching, either before or after a session of running, or even outside of running sessions, does not have a protective effect for running injury. This conclusion is in agreement with a recent systematic review of prospective cohort studies on risk factors for running-related injuries that found no

association between stretching and the development of injuries in runners.²⁴

A large number of publications have shown that stretching does not reduce the risk of running injury.^{24,25} So why do runners believe that stretching prevents injury? Reports of the mistaken belief that stretching helps reduce muscle soreness after exercise may be the origin of

study²³ found that runners identified as pronators wearing a motion-control shoe had a higher risk of injury than pronators wearing a neutral shoe. Additionally, in a systematic review, Richards et al²² concluded that prescribing running shoes based on foot type is not evidence based. Despite the general beliefs of the runners who were interviewed, there is currently no evidence that the use of running shoes based on foot type is effective in reducing running-related injuries. It seems that the runners' belief about running shoes based on foot type might have been influenced by media such as television, running magazines, and newspapers, as well as the shoe industry.

Excessive training was reported by the runners as one of the main factors related to injury risk. The following quotation from an experienced runner demonstrates his concern about excessive training: "...Running excites me when I start to run, when you are running you don't want to stop, your body wants more, so you end up overloading your body and get injured..." (subject 49). Some studies have associated the excitement or pleasure of running with a certain state of dependency or addiction, which most runners associate with a "good addiction," and perhaps with the numerous health benefits of running.^{2,3} However, when excessive, running, similar to any other sport or work activity, may cause damage to body structures, resulting in overuse injuries.^{1,12} This rationale seems obvious, but runners who tend to excessively train appear to associate this excess training to something more positive than negative, without adopting the necessary precautions to prevent excessive training. A potentially effective strategy to avoid overtraining is periodic training: a progressive program of running, a strict control on volume and intensity, and adding rest as part of training. The report of a runner who experienced a running injury reflects this rationale: "Some people see rest as loss of training, but rest is part of the training..." (subject 37). The belief of the interviewed runners about the

risks of overtraining is consistent with the literature; however, awareness about rest and strategies to control the volume and intensity of training seems less understood, and so should be promoted to runners.

Another factor commonly mentioned by the runners was not respecting or exceeding the body's limitations. This factor was similar to 2 other aspects, namely, excess training and the individual runner's perception of his or her body or training loads. A quotation from one runner shows how runners believe that the body's limits are individual and unique: "You can't exceed your limits, because everybody has a limit and you need to respect it; everybody knows their own limits..." (subject 73). Knowing your own limits, as suggested by some runners, seems to be a subjective characteristic associated with an individual's perception about his or her own body and is difficult to measure. However, a preventive educational program for runners may consider this reasoning that many runners have about respecting one's body, not overstressing, and respecting the presence of pain.

This study has some limitations. The convenience sample of runners interviewed was selected from different parks and races, and may not represent the opinions and beliefs of the entire community of runners within and outside São Paulo, Brazil. Because beliefs and opinions are influenced by cultural background, the outcomes of this study could be different in other cultural settings. Additionally, we did not investigate the source of the runners' beliefs (ie, where they get the information) that might have influenced their beliefs and attitudes. We interviewed a sample of recreational runners; thus, the results of this study may not apply to competitive or elite athletes, who would likely have different sources of information to mold their beliefs (eg, coaches, health professionals).

This qualitative study demonstrates that runners have some misperceptions about running-related injuries. For instance, the practice of stretching, the

importance of foot type, and the use of special running shoes were identified by runners as important factors related to running injuries, whereas the scientific literature does not support these beliefs. On the other hand, runners often correctly mentioned excess training and not respecting or exceeding the body's limitations, which have been shown in research to be factors that may influence the probability of injuries. Preventive running-injury programs should incorporate the beliefs of runners to improve effectiveness and implementation. The beliefs identified in this study demonstrate that runners need more information on the research-related literature on risk factors, including clarification of the misconceptions previously identified. In addition, our findings may also help health professionals to treat injured runners through a better understanding of runners' beliefs related to running injuries.

CONCLUSION

THE MOST FREQUENTLY STATED FACTORS leading to running injuries mentioned by recreational runners were related to training habits and running shoes, such as not stretching, excessive running, not wearing the correct running shoe, and foot-type changes. In addition, many runners also mentioned the body's limits and the importance of respecting their bodies when running. We noted that some of the runners' beliefs are not supported by the research literature. This study provides information on factors that recreational runners believe to be related to running injuries, and this knowledge may need to be considered when developing preventive educational strategies for running injuries and treating running injuries. ●

KEY POINTS

FINDINGS: The most frequently stated factors leading to running injuries mentioned by recreational runners were related to training, running shoes, body limitations, and the importance of re-

specting their bodies when running. **IMPLICATIONS:** The beliefs identified in this study demonstrate that runners need more information about the risk factors related to running injuries, as several of these beliefs are not supported by current evidence. Preventive programs for running injuries should incorporate the beliefs of runners for greater effectiveness and implementation. **CAUTION:** This randomly selected sample of Brazilian recreational runners may not represent the beliefs of runners from different geographic regions, cultural backgrounds, and training levels and expertise.

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