KEYWORDS

Low back pain, prevention, disability, activity limitation, orthopaedic.

Incidence of low back pain in young amateur sports practitioners

INTRODUCTION

In the general population the epidemiology of low back pain has been well researched in numerous scientific studies, but given the considerable methodological heterogeneity among the studies conducted, there is still a wide range between the prevalence and incidence values that are reported in the literature.

The lifetime prevalence for the general population was estimated to be more than 85%; The one-year prevalence of Low Back Pain varies in a range of 1% to 83%. Estimates of the 1-year incidence of any episode of Low Back Pain are in a range of 1.5% to 36%, with an average of 5% per year in the adult population. Despite this, an accurate epidemiological estimate of the incidence and prevalence of lower back pain is necessary to understand the actual impact of the disease in the general population and an important basis on which to start for assessments concerning etiopathogenesis and other aspects of low back pain (2).

The relationship between low back pain and physical activity has been sought in numerous scientific studies and the importance of physical activity in the treatment of low back pain is universally accepted. Nonethe, the increase in physical activity was

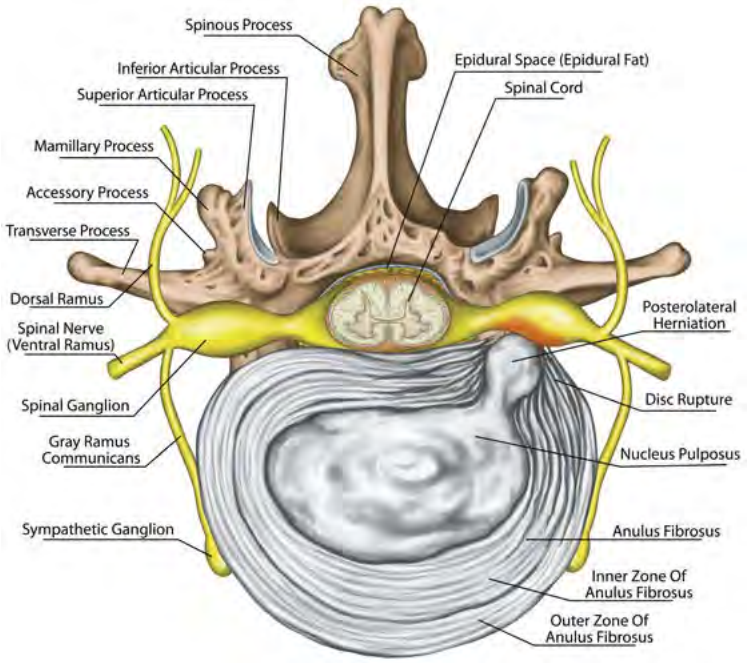
Dott. L. Piccione,
Department of Applied Clinical Sciences and Biotechnology, University of L'aquila

Prof. Giuseppe Costanzo,
Orthopaedic and Trauma Clinic, Sapienza, University of Rome

Prof. Leonardo Bizzarri,
Department of Applied Clinical Sciences and Biotechnology, University of L'aquila

Dott.ssa Enrica Liaci,
Department of Applied Clinical Sciences and Biotechnology, University of L'aquila
enrica.liaci@gmail.com

Dott. Francesco Bizzarri,
Department of Applied Clinical Sciences and Biotechnology, University of L'aquila



suggested to be both a preventative factor and a possible risk factor for Low Back Pain. There is a great number of evidence that it correlates a high physical workload with lower back pain. For example, occupational exposure, strenuous workloads, frequent push-ups, twists or weightlifting, and high-intensity sports activity are known risk factors for Low Back Pain. At the same time, inactivity and a sedentary lifestyle have been shown to be associated with the onset of the disease. In fact, many studies have shown that both excessively reduced physical activity and, on the contrary, too intense can be detrimental to spinal well-being, but the relationship between sport and Low Back Pain has not yet been adequately clarified (23). Elite athletes having a higher frequency and a higher degree of physical activity intensity have a higher risk of developing episodes of Low Back Pain. Frequent training and competitions subject athletes to a great commitment in terms of workload, thus determining a high level of stress of the musculoskeletal system, Varying according to the type of sport, this stress is particularly high in adolescence (14 years of age), that is, at the time of the start of many of the high-level competitive activities , until it reaches its peak at the age at which the athlete has the highest level of competitive performance and over 40 years.

The amount of workload on your back depends on duration, intensity, frequency of training, type of sport, level of competition and training and rest periods during the year. However, the exact influence of the daily effort made by athletes on The Back Pain is not known.

It is universally recognized that sport has a positive impact on the health of the general population, but it has not yet been established what is the best dose-effect relationship. As in the general population, LBP in athletes represents an important socio-economic expense, reduces the quality of life, limits sports performance and is one of the main causes of absence from training and sports competitions. In this context, the LBP is therefore an important topic of study for many sports medicine specialists, athletes, coaches and physiotherapists.
Understanding how sport in general and the specific type of sport, such as training and competitions, are associated with a higher or lower frequency, in terms of prevalence and incidence, of Low Back Pain represents a current challenge and of important importance in health and socio-economic terms. This information could facilitate the identification of possible risk factors and enable the development of prevention strategies in groups of athletes who practice high-risk sports for Low Back Pain.
The purpose of this study was therefore to determine the incidence of Low Back Pain in amateur sports practicing athletes, aged between 19 and 34, in order to check whether there were statistical differences between the different types of sports examined (individual or team), to look for possible risk factors for the appearance of episodes of lower back pain and to compare these data with those currently present in the scientific literature.

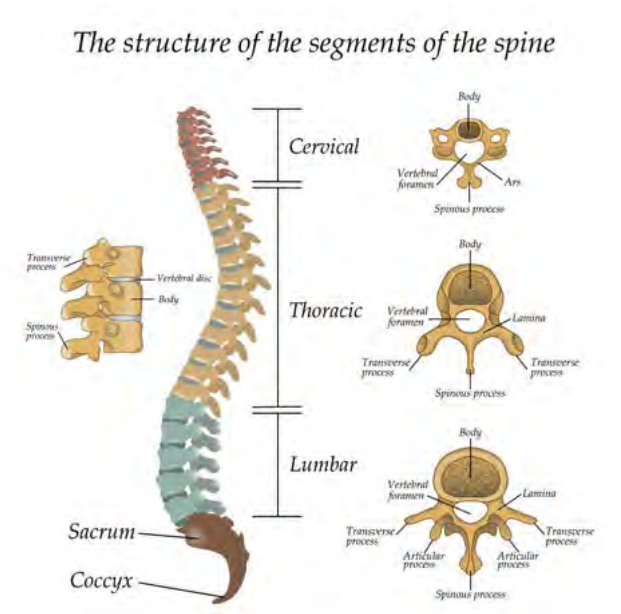
MATERIALS AND METHODS

An observational study was conducted with a retrospective part and a two-year perspective, 2014-2016, on a cohorta of 298 non-professional athletes, practitioners 11 different sports disciplines, attending the CUS, University Sports Centre, Aquila. The study protocol received the approval of the Ethics Committee and informed consent was obtained from each patient.
In May 2014, we invited 395 athletes from 22 sports teams, 11 men and 11 women, from the CUS of Eagle to participate in our study, taking into account 11 different sports. The sports covered were: rugby, volleyball, handball, football, 5-a-pack, sports climbing, swimming, downhill skiing,

street skating, sports dance, air shooting. Two women's teams, one football team and one of 5-a-side football, refused to participate in the study (No. 34). Of the remaining 20 participating teams, 43 athletes refused to take part in the clinical trial.
They included athletes under the age of 35, who were official members of the participating teams, who had played at least one official game in the previous season, whose training program included a minimum of three workouts per week (including the race). Athletes who were injured at the start of the study were excluded for any cause.
Of the 318 athletes who had decided to participate in the study, 12 were excluded because at the time of the start of the study, September 2014, they suffered from injuries due to causes not due to lower back pain and 2 athletes were excluded because they had suffered from LBP in the previous 4 weeks. Six athletes were eventually excluded because they had not taken part in official competitions in the previous year.

During the 2 years of follow-up 298 athletes, of which 179 males and 119 females, belonging to different sports teams, participated in the study. The enlisted athletes were thus divided by sport:

- Sports climbing: 18 male and 15 female athletes;
- Second-tier men's football: 20 athletes;
- C-series men's 5-a-side football: 13 athletes;
- Sports dance: 12 male and 12 female athletes;
- Swimming: 14 men and 15 women;
- Men's handball from series B: 18 athletes;
- Second-class women's handball: 15 athletes;
- Men's first-class volleyball: 20 athletes;
- C-series women's volleyball: 17 athletes;
- Road skating: 17 male and 10 women athletes.
- Men's rugby: 29 athletes;
- C-Series women's rugby: 25 athletes;
- Downhill skiing: 10 male and 8 women athletes;
- Compressed air shooting: 7 male and 3 women athletes;



The follow-up covered the years 2014-2015 and 2015-2016 and had an average duration of 576-153 days. The athletes were followed from the beginning of the competitive activity, in September, until the end of the same, in the months of May or June depending on the sport practiced. All athletes were given a questionnaire in September 2014.

Data were collected on: the generalities of athletes, gender, age, type of sport, the number of injuries suffered in the past related to sports practice; athletes were also asked if they had suffered in the last 12 months of Low Back Pain (LBP) and, in the case of the yes answer, whether the etiology of the episode of lower back pain and the treatment that had been administered were known. He was finally asked how long since the episode of Low Back Pain had returned to the sport. To make sure that the athletes understood all parts of the questionnaire. An Orthopaedic Specialist Physician was available to answer athletes' questions and made sure that the questionnaire was completed in all its parts at the time of delivery. Later, also in September 2014, then before the start of the sports season, during preparation, all athletes were performed an objective orthopedic examination and was specifically evaluated their articularity, muscle trofism and the possible presence of morphological alterations of the musculoskeletal apparatus evident to the clinical eye. Height and BMI were also measured at all athletes.

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ery. Later, also in September 2014, then before the start of the sports season, during preparation, all athletes were performed an objective orthopedic examination and was specifically evaluated their articularity, muscle trofism and the possible presence of morphological alterations of the musculoskeletal apparatus evident to the clinical eye.

Height and BMI were also measured at all athletes.

The 47 athletes, who reported in the questionnaire episodes of LBP in the last year of activity, were then performed an X-ray examination of the spine under load in two projections, postero-front and lateral, to assess the possible presence of pathologies compatible with the clinical picture of Low Back Pain. Among the athletes undergoing the X-ray examination, 7 athletes had evidence consistent with suspected cadres of discopathy or spinal squid. These patients were then given a second-level diagnostic examination: mrI (MRI) of the spine.

The two hundred and ninety-eight athletes, 179 males and 119 women were studied during the sports years 2014/15 and 2015/16 from September, that is, from the beginning of their competitive activity, to May or June, that is, until the end of the competitive activity.

Athletes were regularly observed three times a week both during training, twice a week, and once a week during the competitive competition. The observation was aimed at finding any type of pathological event, of a traumatic and non-traumatic nature, that could occur during sports activity, and in particular to assess the onset of episodes of Low Back Pain in various types of sports.

All athletes were treated and followed until full recovery with their return to competitive activity. Specifically, athletes who had presented episodes of Low Back Pain were treated in the first instance with medical therapy: FANS corticosteroids and myo-relaxing; where it was required with brace, orthopedic bust, and physio kinesitherapy.

In our study we defined Low Back Pain in accordance with the definition of Kuorinka et al. "localized pain in the lumbar seat, below the rib lower margin and above the lower buttock fold, which may or may not be associated with pain in the lower limb (sciatica)" (13).

In our study, however, only episodes of lower back pain were taken into account, resulting in an absence from training or competitions for more than a week. This choice was made in order to assess only the relevant episodes of low back pain, excluding episodic events that did not affect sports activity.

Statistical analysis

Statistical analysis was conducted with the SPSS program, version 21.0, for Windows (SPSS, Inc, Chicago, IL). Continuous variables were expressed as mean and standard deviation; categorical variables such as counts and proportions. The comparison between the groups was carried out with a significance test for quantitative variables in two groups: the Mann-Whitney test. Also, if the data did not have a normal distribution, Wilcoxon's method was used. For categorical variables, both the Chi-Quadro and Fisher tests were used.

The logistic regression model was applied with binomial families and log-link functions to identify multivariate associations. Odds Ratios were reported with a 95% confidence interval. have been statistically significant P-values less than or equal to 0.05.

Table 3.

Variabili	*Tutti gli sport* *All sports* *N (%)*	*Sport individuali* *Individual sports* *N (%)*	*Sport di squadra* *Team sports* *N (%)*
Numero totale degli atleti osservati al follow-up Total number of athletes observed at follow-up	276	133 (48,2)	143 (51,8)
persi al follow-up lost at follow-up	22	9 (36,4)	13 (63,6)
Infortunati durante le successive stagioni (2014-2016) Injured during the following seasons (2014-2016)	33 (12)	14 (10,5)	19 (13,3)
Storia di infortuni per LBP nei 12 mesi precedenti History of LBP injuries in the previous 12 months	37 (13,4)	17 (45,9)	20 (54,1)
Imaging patologico della colonna vertebrale al baseline Pathological imaging of the spine at baseline			
RX	18 (6,5)	3 (16,7)	15 (83,3)
RMN	5 (1,8)	0 (0)	5 (100)

RESULTS

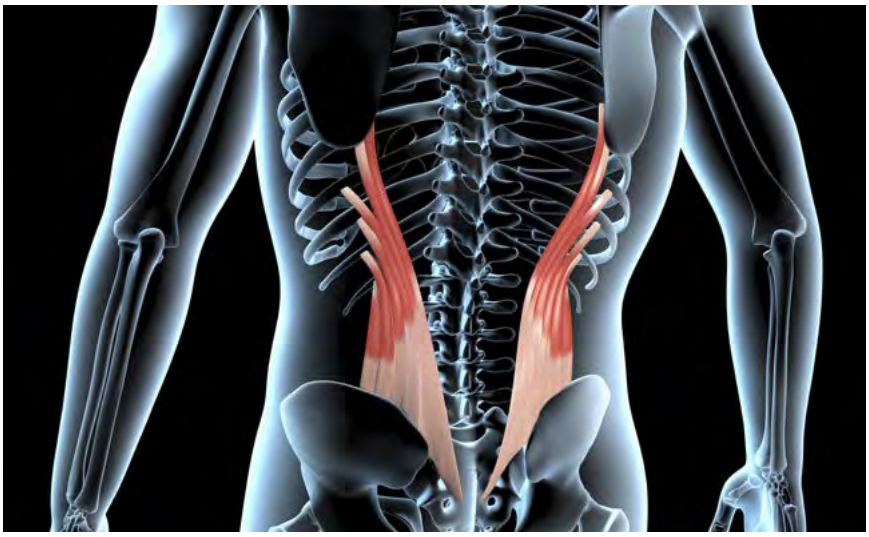
The demographic and clinical characteristics of the population under consideration are shown in the following tables.

The age range of athletes at the time of the study began was 20-34 years for male athletes and 19-27 years for female athletes. The average age was 22.8 to 2.6 years (22 to 1.8 years females and 23 to 2.9 years for males). The sample, at the time of the start of the study, consisted of 298 athletes, 179 of whom were male and 119 were female; After two years of follow-up the number of athletes stabilized at 276 athletes, as 22 athletes were lost to follow-up (13 males and 9 females).
Data collected from the questionnaire administered showed that 47 athletes, including 19 males and 28 females, representing 15.8% of the total sample, reported having suffered from Low Back Pain in the last 12 months. This group of 47 athletes, who reported a history of LBP to their medical history, were then performed an X-ray of the spine under load in two projections, postero-front and lateral, to assess the possible presence of pathologies compatible with the clinical picture of Low Back Pain.

After performing the X-ray examination of the spine, it was found that 22 athletes, including 10 males and 12 females, or 7% of the total sample taken into account, had radiological frameworks of spinal pathologies that could justify the clinical history of Low Back Pain. The other 25 athletes examined had no significant alterations to the X-ray examination that justified what they claimed.
The pathologies found at X-ray of the spine were:

- 2 cases of 1/2 degree spondilolists of spondyllolists found in a male and female athlete;
- 10 cases of alterations of sagittals curves: in 7 male and 3 female athletes;
- 3 cases of 20-to-25 degree of back-lumbar scoliosis in 3 female athletes;

Seven athletes who had an X-ray of the spine with an objectivity compatible with paintings of possible discopathy or spinal schisi were given a second-level diagnostic examination: nuclear magnetic resonance imaging (MRI) of the spine.



This last examination showed:

- 1 case of clesis of the fifth lumbar vertebra, L5, in a female athlete;
- 2 cases of intervertebral disc protrusion found in a male and a female respectively;
- 4 cases of symptomatic disc hernias including 1 case at L4-L5 level in a male athlete and 3 cases at L5-S1 level in female athletes.

The results of the follow-up were compared with those of the (table 3, chart 1).

LBP predictors at the screening questionnaire

Comparing the demographics of the tested cohorts with the results of the screening test administered by the chi-framework test, it is shown that only the sex variable influenced the patient's likelihood of response in reporting lower back pain in the 12 months prior to the start of the study. Instead, the type of sport practiced by athletes, and the variable individual sport or team sports, were not the results of the variables that influenced the response. The logistic regression model, taking into account as a dependent variable the feedback to the affirmative response questionnaire about having had episodes of Low Back Pain in the previous 12 months, showed that the risk factors were found: the female sex (OR-2,944, p-0.01) and the age greater than or equal to 23 years (OR-1,940, p-0.047). The results of the study can be seen in the table below.
The type of sport practiced by athletes, as well as whether the sport were individual or team, were not found to be risk factors for having had LBP in the 12 months prior to the administration of the questionnaire, as reported in tables 3 and 4.

Predictors of pathological imaging feedback

Comparing the results of diagnostic imaging tests with those of the screening questionnaire as shown in the tables, a correlation was shown between pathological imaging feedback and a history of low back pain in the previous 12 months (Table 5).

The results of the follow-up

During the follow-up period following the administration of the questionnaire, which lasted two years (2014-2016), of the 276 athletes who were followed until the end of the study, 33 athletes, 12% of the sample, in which there were episodes of lombalgia of such intensity that they compromised their participation in competitions and trainings for more than a week; of these 16 were men, and 17 were women.

The sports involved were:

- Sport climbing with 1 male athlete;
- 5-a-side football with 2 athletes, both male;
- 11-a-player football with 1 male athlete;
- The sports dance with 2 athletes, both female;
- Swimming with 5 athletes, 4 of whom are female and 1 male;
- The handball with 6 athletes, of which 4 females and 2 males;
- Volleyball with 7 athletes, of which 3 females and 4 males;
- Wheelchair skating with 4 athletes, 3 of whom are female and 1 male;
- Rugby with 3 athletes, of which 2 males and one female;
- Skiing with 1 male athlete;
- Shooting with 1 male athlete;

Of the 33 patients who had submitted to the LBP follow-up, 10 athletes were found to have relapsed: they had reported to have suffered from low back pain in the 12 months prior to the start of the study. All 10 of these patients also tested positive for the X-ray study conducted after the questionnaire was administered (Table 7).

Comparing the results of the screening questionnaire with those of follow-up, it was also rejected the hypothesis that patients who had reported suffering from episodes of LBP in the 12 months prior to the start of the study had then had a recurrence of the painful syndrome. This is demonstrated by the chi-framework test results in the McNemar variant shown in the table. This shows that there is a correlation between the patients who had reported LBP to the questionnaire and those who then had it at follow-up (tables below in the sequence LBP contingency table at the questionnaire - LBP to the follow-up - McNemar Test to assess the significance of the LBP contingency to the questionnaire - LBP at follow-up) (Tables 8 and 9).

The logistic regression test showed, however, that reporting

Table 4. LBP predictors at the questionnaire

Predittori di LBP al questionario LBP predictors at the questionnaire	B B	S:E S:E	Wald Wald	gl gl	p*-value p*-value	Or Or
Femmine Females	1,08	0,335	10,376	1	0,001	2,944
Età >23 anni Age >23 years	0,663	0,333	3,956	1	0,047	1,94
Costante Constant	-2,507	0,322	60,604	1	0,082	0,082

I p-value sono stati calcolati con il test del Z^2. Il modello di regressione logisica è stato applicato per l'analisi multivariata. NS: non significativo
The p-values were calculated with the Z2 test. The logisic regression model was applied for multivariate analysis. NS: not significant

Table 5. LBP contingency to the questionnaire, RX+

		LBP+ al questionario LBP+ to the questionnaire 0	 1
RX	Conteggio Count % in LBP+ al questionario % in LBP+ to the questionnaire	251 100,00%	0 0,00%
SCHISI LS CLEFT LS	Conteggio Count % in LBP+ al questionario % in LBP+ to the questionnaire	0 0,00%	1 100,00%
ALTERAZIONE CURVA SAGITTALE SAGITT CURVE ALTERATION	Conteggio Count % in LBP+ al questionario % in LBP+ to the questionnaire	0 0,00%	10 100,00%
DISCOPATIA DISCOPATHY	Conteggio Count % in LBP+ al questionario % in LBP+ to the questionnaire	0 0,00%	6 100,00%
NO	Conteggio Count % in LBP+ al questionario % in LBP+ to the questionnaire	0 0,00%	25 100,00%
SCOLIOSI SCOLIOSIS	Conteggio Count % in LBP+ al questionario % in LBP+ to the questionnaire	0 0,00%	3 100,00%
SPONDILOLISI 1° SPONDYLOLYSIS 1°	Conteggio Count % in LBP+ al questionario % in LBP+ to the questionnaire	0 0,00%	1 100,00%
SPONDILOLISTESI 1° SPONDYLOLISTHESI 1°	Conteggio Count % in LBP+ al questionario % in LBP+ to the questionnaire	0 0,00%	1 100,00%
Totale Total	Conteggio Count % in LBP+ al questionario % in LBP+ to the questionnaire	251 100,00%	47 100,00%

on screening that he had suffered from LBP in the 12 months before carried a 3 times greater risk of developing the painful syndrome during the two years of follow-up. The female sex and age greater than or equal to 23 years were not found to be statistically significant risk factors, contrary to what was previously achieved for the screening test (tables below sequenced LBP Predictors to follow-up - Individual sports contingency table - LBP to follow-up - Sports as a predictor of LBP to follow-up) (Tables 10, 11 and 12).

Table 7. Clinical and demographic characteristics of athletes with LBP recurrence at follow-up.

età age	sesso sex	sport sport	RX RX	RMN RMN
23	Femmina Female	Nuoto Swimming	Alterazione curvatura sagittale Alteration of sagittal curvature	non valutato not evaluated
19	Femmina Female	Pallamano Handball	Alterazione curvatura sagittale Alteration of sagittal curvature	non valutato not evaluated
21	Femmina Female	Pallamano Handball	Spondilolistesi 1° Spondylolisthesi 1°	non valutato not evaluated
27	Femmina Female	Pallamano Handball	Discopatia Discopathy	Ernia discale L5-S1 Herniated disc L5-S1
23	Maschio Male	Pallavolo Volleyball	Spondilolisi 1° Spondylolisthesi 1°	non valutato not evaluated
23	Maschio Male	Pallavolo Volleyball	Alterazione curvatura sagittale Alteration of sagittal curvature	non valutato not evaluated
24	Femmina Female	Pallavolo Volleyball	Discopatia Discopathy	Protusione discale Disc protusion
24	Maschio Male	Pallavolo Volleyball	Discopatia Discopathy	Ernia discale L4-L5 Herniated disc l4-L5
24	Maschio Male	Rugby Rugby	Discopatia Discopathy	Protusione discale Disc protusion
22	Femmina Female	Rugby Rugby	Alterazione curvatura sagittale Alteration of sagittal curvature	non valutato not evaluated

DISCUSSION

Validity of the study

Low back pain is by definition a symptom and therefore a subjective phenomenon. Therefore, responses to the screening questionnaire regarding previously reported episodes of low back pain, heteopathogenesis, diagnosis and treatments known to athletes raise several questions about their validity. However, these problems have been found and discussed in numerous other scientific studies over the years, as well as in this work (20).

Several aspects need to be taken into account in order to judge the internal validity of our study.

The rate of athletes lost to follow-up was 7% of the initial sample, but these were evenly distributed by both gender and sport type, not significantly altering the characteristics of the cohort. Unfortunately, some of these patients (no.10) had stated to the questionnaire that they had had episodes of LBP and in 4 had also been found to have pathological alterations to the RX and MRI of the spine (2 alterations of sagittal curvature, 1 discale hernia, 1 schiSi of L5). It was therefore not possible to verify, even in these cases, the possible presence of relapses in these athletes who, as demonstrated in our study, presented a risk significantly greater than being able to suffer from LBP during the two years of follow-up.

In the two phases of the preliminary study, in which the screening questionnaire was administered and diagnostic imaging tests were carried out, and in the subsequent clinical follow-up, data on the pres-

Table 9. McNemar test to assess the significance of LBP+ contingency to questionnaire* LBP at follow-up

	Valore Value	p
Test McNemar Test McNemar		0,672
N. di casi validi N. of valid cases	276	

Table 8. LBP + to questionnaire * ABP contingency table to follow-up

			LBP al follow-up LBP at follow-up NO	SI	Total
LBP + al questionario LBP + to the questionnaire	NO	Conteggio Count	216	23	239
		% in LBP+ al questionario % in LBP+ to the questionnaire	90,38%	9,62%	100,00%
	SI Yes	Conteggio Count	27	10	37
		% in LBP+ al questionario % in LBP+ to the questionnaire	72,97%	27,03%	100,00%
Totale Total		Conteggio Count	243	33	276
		% in LBP+ al questionario % in LBP+ to the questionnaire	88,04%	11,96%	100,00%

ence of LBP in the population were obtained using different methods. Initially the data was collected through a standardized questionnaire, then through clinical observation conducted by medical staff in the two years in which athletes were followed during training and competitions. The validity of the data collected at the follow-up therefore appears considerably higher than those collected through the responses provided by the athletes.

During the follow-up, the diagnostic imaging tests carried out during the preliminary phase of the study on the group of athletes who had reported LBP to the questionnaire were not repeated. In fact, although patie cost of these examinations and the resolution of lower back pain with the therapies administered discouraged patients from performing them. It was therefore not possible to assess from an etiopathogenetic point of view the cases of LBP at follow-up that had not been examined prior to imaging, nor to analyses the evolution of the frameworks described above.
We evaluated in our study athletes of young age (average = 23 years) initially asymptomatic who in most cases did not frequently report LBP. Therefore, it is not possible to consider whether the results of our study are exportable to the general population or whether it is possible to refer them to a similar sports cohorta as several studies have shown that there are cultural differences in reporting LBP. We believe that this study, however, can help to better understand the risk factors that determine the appearance and evolution of LBP among the amateur sports-practicing young population.
Nts were followed by medical staff and in several cases an imaging test was required, the high cost of these examinations and the resolution of lower back pain with the therapies administered discouraged patients from performing them. It was therefore not possible to assess from an etiopathogenetic point of view the cases of LBP at follow-up that had not been examined prior to imaging, nor to analyses the evolution of the frameworks described above.
We evaluated in our study athletes of young age (average = 23 years) initially asymptomatic who in most cases did not frequently report LBP. Therefore, it is not possible to consider whether the results of our study are exportable to the general population or whether it is possible to refer them to a similar sports cohorta as several studies have shown that there are cultural differences in reporting LBP. We believe that this study, however, can help to better understand the risk factors that determine the appearance and evolution of LBP among the amateur sports-practicing young population.

Discussion of results

Our study found that a history of LBP in the previous 12 months was a significant predictive factor for the subsequent development of LBP over the next two sports seasons. In particular, athletes who had responded positively to the screening questionnaire question about having had episodes of lower back pain had a 3 times higher risk of having relapses during the follow-up period. Greene et al. achieved virtually the same conclusions in an observational cohort study of 679 Yale University athletes who practiced 30 different sports (1).

In fact, this study showed that athletes who had had any episodes of lower back in the previous five years, which had resulted in their suspension of sports activities for more than a week, reported a 3-fold higher risk of developing LBPs during the following sports season. In addition, as in our study, there were no statistically significant differences in the type of sport being played.

Further out, as in our study, the demographic characteristics of the population (sex, age) and the type of sport practiced, were not predictors for the subsequent development of LBP (1).

In other scientific studies, significant differences in the incidence of low back pain were found depending on the type of sport played (2,4649). However, these results, which are at odds with the analysis of our data, can be justified by the larger sample size of athletes practicing the same type of sport taken in observation.
The main limitation in our approach was to study a wide variety of university athletes from all the same institution. Despite this, the data obtained regarding the two-year incidence of LBP in our population (12%) they are similar to those obtained by Keene et al., which reported an LBP injury incidence of 7% per year in a study of 4970 university athletes who had a duration of 10 years (5). Although our data are therefore representative of a university population, these have been extrapolated with a high level of confidence.
In our work no attempt has been made to correlate the incidence of lower back pain with the exposure time of athletes during training or competitions, for several reasons. First, we were not comparing the incidence of low back

Table 10. LBP predictors at follow-up

Fattori Factors	B	S.E.	Wald	gl	Sign.	OR	Inferiore Inferior	Superiore Superior
Fase 1° sesso (1) Stage 1 sex (1)	,335	,395	,718	1	,397	1,397	,644	3,031
età_23ANDover age_23ANDover	-,134	,398	,113	1	,737	,875	,401	1,908
LBP al questionario LBP to the questionnaire	1,180	,446	7,011	1	,008	3,256	1,359	7,801
Costante Constant	-2,322	,330	49,487	1	,000	,098		
I p-value sono stati calcolati con il modello di regressione logistica *P-values were calculated with the logistic regression model*								

pain between individual types of sport or between the sexes, as a normalization of the sample would have been necessary. Second, because the rationale for our hypothesis was that if there were risk factors that prepared athletes to have LBP injuries, then having had previous episodes of lower back was a good predictor of subsequent injuries.
Based on our results, the hypothesis nothing that the likelihood of developing injuries is equally distributed in a population of amateur sports practitioners must be rejected. Our work shows that only a history of previous episodes of LBP has been found to be predicting the occurrence of other injuries in the next two sports seasons. This evidence may therefore suggest that low back pain leads to a series of alterations in biomechanics, motor control and other aspects of sports practice that lead to an increased risk of recurrent injuries in the athlete.
The message that our studio therefore wants to send is addressed to all athletes, coaches and sports trainers.
It is known that athletes who have had a history of LBP injuries have a 3 times greater risk of sustaining an injury recurrence than those who do not have the same medical history. These risk factors should be taken into account for screenings that are carried out before the start of the sporting season and to outline the possibility of performing exercises that prevent this type of injury during sports practice.

CONCLUSIONS

1. Athletes with a history of previous episodes of lower back pain, who have prevented them from participating in training and competitions in the previous 12 months, have a 3 times greater risk of developing subsequent recurrences of LBP injury than other athletes.
2. The relative risk of having an LBP injury is not dependent on demographic factors, such as age, gender or type of sport (individual or team)

Athletes who have suffered a lower back injury in the last 12 months should be considered at greater risk of developing recurrences. These patients therefore need to consider possible prevention strategies

Table 11. Individual sports contingency table * LBP at follow-up

			LBP al follow-up LBP at follow-up 0	1	Total
sport individuali individual sports	,00	Conteggio Count	124	19	143
		% in sport individuali % in individual sports	86,7%	13,3%	100,0%
	1,00	Conteggio Count	119	14	133
		% in sport individuali % in individual sports	89,5%	10,5%	100,0%
Totale Total		Conteggio Count	243	33	276
		% in sport individuali % in individual sports	88,0%	12,0%	100,0%

Table 12. Sports as a predictor of LBP at follow-up

Test Test	Valore Value	gl	p	Sign. esatta (bilaterale) Sign. exact (bilateral)	Sign. esatta (unilaterale) Sign. exact (unilateral)
Chi-quadrato di Pearson Pearson chi-square	0,499	1	0,48		
Correzione di continuità Continuity correction	0,271	1	0,603		
Rapporto di verosomiglianza Relationship of true similarity	0,501	1	0,479		
Test esatto di Fisher Fisher exact test				0,578	0,302
Associazione lineare per lineare Linear binding for linear	0,497	1	0,481		
N di casi validi N of valid cases	276				

ABSTRACT

Low Back Pain is a particularly frequent and important health issue in the general population; It is one of the main causes of disability, reducing quality of life and ability to work, thus resulting in a large socio-economic expense for patients and for society. Low Back Pain is also one of the main causes of activity limitation and absence from work in most countries of the world, making it one of the biggest causes of health care spending.

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