

Tendinitis in bodybuilders: cross-sectional study

Tendinites em praticantes de musculação: estudo transversal

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RESUMO | INTRODUÇÃO: Exercícios com cargas vêm se mostrando eficiente na promoção de saúde e ocupando cada vez mais espaço no cenário de prática esportiva atual, porém merecem atenção em relação a ocorrência de lesões, em especial as tendinites. **OBJETIVO:** Avaliar a prevalência de tendinites em praticantes de musculação, divididos em três grupos, verificando os fatores de associação. **MÉTODOS:** Estudo transversal, descritivo e analítico, de caráter quantitativo. A amostra foi composta por 208 alunos com idade a partir de 18 anos. Foi utilizado um questionário próprio composto de dados sociodemográficos e relacionados à presença ou não de tendinites, que foi confirmada através do diagnóstico médico. Os dados foram tabulados e analisados no SPSS 15.0, sendo geradas as frequências relativas e absolutas de interesse para pesquisa. As associações entre a tendinite, o tipo de treinamento e os fatores associados foram analisadas a partir do teste do qui-quadrado ou Exato de Fischer. **RESULTADOS:** A prevalência de tendinite foi de 17,8% foi associada ao treino de hipertrofia, ser do sexo masculino, usar anabolizantes, suplementos e medicamentos, além de não treinar sem supervisão. **CONCLUSÃO:** A tendinite apresenta-se como uma lesão frequente em praticantes de musculação. Existem alguns fatores que contribuem para ocorrência dessa lesão, servindo de alerta aos profissionais de saúde a fim de minimizar essa lesão.

PALAVRAS-CHAVE: Musculação. Exercícios. Tendinite.

ABSTRACT | INTRODUCTION: Exercises with loads have been shown to be efficient in promoting health and occupying more and more space in the current sport practice scenario, but deserve attention in relation to the occurrence of injuries, especially tendinitis. **OBJECTIVE:** To evaluate the prevalence of tendonitis in bodybuilders, divided into three groups, verifying the factors that are associated with this affection. **METHODS:** Cross-sectional, descriptive and analytical study of a quantitative nature. The sample consisted of 208 students aged 18 years and over. A self-administered questionnaire composed of sociodemographic data and related to the presence or absence of tendonitis was used, which was confirmed through medical diagnosis. The data were tabulated and analyzed in SPSS 15.0, generating the relative and absolute frequencies of interest for research. The associations between tendonitis, type of training and associated factors were analyzed from the chi-square test or Fischer's exact test. **RESULTS:** The prevalence of tendonitis was 17.8% and was associated with hypertrophy training, being male, using anabolic steroids, supplements and medications, besides not being accompanied. **CONCLUSION:** Tendonitis is a frequent injury in bodybuilders. There are some factors that contribute to the occurrence of this lesion, serving as an alert for health professionals in order to minimize this involvement.

KEYWORDS: Bodybuilding. Exercises. Tendonitis.

Introduction

Among the various forms of physical activities, exercises with loads are turning to be more efficient to health promotion in general, generating a meaningful improvement in debilitated people. These exercises are known as bodybuilding, being “resisted exercises”, commonly known among the academics. In this scenery, bodybuilding is without a question a major benefit to the human being and its practice has been gaining more and more supporters, targeting the public that aims at hypertrophy, weight loss, or primarily the well being and quality of life¹.

However, even though the studies prove the importance of resisted training in health and classify it as very safe when compared to other sports, its action when not performed in a correct way can cause an increase in the risk of injury in this group of practitioners, mainly among those who perform sport activities in a professional manner. These lesions can be crucial not only for the practice of physical activity, but also for the professional activity, as well as the need to search for specialized care².

Among the frequent injuries, tendinitis is prevalent in the gyms generating pain and movement limitation, and occur more frequently when there is a use of maximum loads for a certain exercise, excessive training, incorrect and / or without any specific orientation, as well as ergonomically poorly designed equipments³.

In face of the considerations above, it is important that professionals are aware of the factors that lead to the development of tendinitis in bodybuilders, in order to search the minimization of this adverse event to the practitioner, and to direct a better execution of the activity. Therefore, this research intends to evaluate the prevalence of tendinitis in bodybuilders, verifying the factors that are associated with this condition, leading to a better understanding on the health professionals’ part, and preventing the occurrence of the injury.

Methods

It is a cross-sectional, descriptive, analytical study of quantitative character. The study was performed

in Vitória da Conquista / BA, a city in the interior of Bahia, which has 343,230 habitants, and has as one of its characteristics the involvement of the population with sports activities. Two gyms, AMY Fitness and Sports Power Academy LTDA, were used as study places.

The present study collected information of 208 subjects, divided between the two gym quoted above. Information was searched according to the type of training performed by each practitioner, divided into 3 groups: Those who train aiming for hypertrophy, those who seek to lose weight, and those who aim only the physical well-being. The number of participants in this study was defined by convenience, choosing to apply the questionnaires to approximately 70 individuals for each one of the groups mentioned. This study included individuals over 18 years of age, of both sexes and who attended a bodybuilding gym for 3 continuous months. The ones who had tendinitis diagnosed before the beginning of bodybuilding were excluded from the investigation.

In order to collect the study’s information, a questionnaire was used, composed of data directly related to the occurrence of musculoskeletal injuries, and sociodemographic and occupational factors, according to the available schedule for each participant. The questions were developed accordingly to the needs of this study, directed to the activity of bodybuilders, addressing issues such as tendinitis (medical diagnosis) in the last 24 months, age, sex, marital status, height, weight, income, category practice, type of activity, use of medications, supplements and anabolics, among others. It is highlighted that all information was based on self-report.

The data collection was only performed after the approval of the Research Ethics Committee of the Independent Northeast College, and was approved through the number of opinions: 1,501,196, being carried out in accordance with the ethical principles of resolution 466/12 of the National Health Council. Participants were approached personally by the interviewer, at the AMY Fitness academies and the Sports Power Academy LTDA, and after being informed about the research, the questionnaire was applied.

The data collected in the research were tabulated and analyzed with the statistical package SPSS (Statistical Package for Social Sciences) 15.0. There were analyzed the relative and absolute prevalences of the study variables, plus their means and standard deviation when necessary. The associations between tendinitis, the type of training and associated factors were analyzed from the chi-square test or Fischer's Exact for those variables with expected frequency below⁵. For all analyzes the level of significance was adopted $p < 0.05$.

Results

A total of 208 subjects with resistance training were interviewed, of whom 51.9% were males and the majority reported as being brown-skinned. The age ranged from 18 to 56 years, with the mean age of the sample being 28.54 ± 8.2 years and with mean of the practice time of 2.39. The general characteristics of the sample are presented in Table 1.

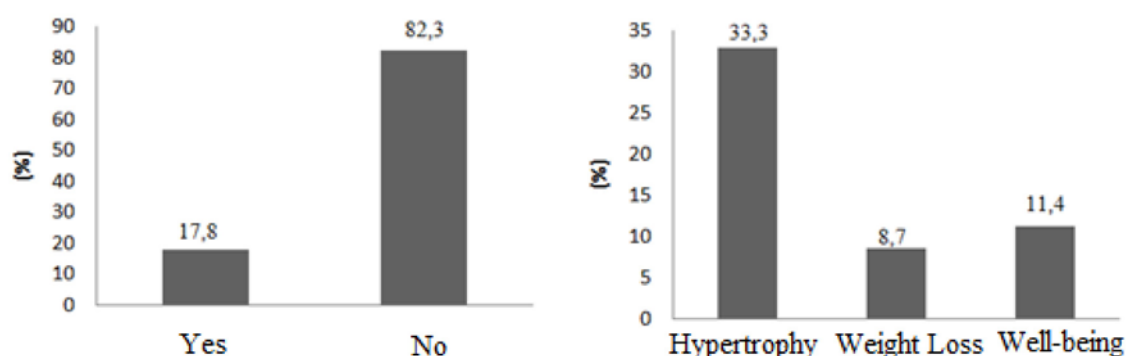
Table 1. Distribution of the sociodemographic, behavioral and health-related variables. Vitória da Conquista, Bahia, Brazil, 2017.

Variables	% answers	N	%
Gym goal	100,0		
Hypertrophy		69	33,1
Well-being		70	33,8
Weight loss		69	33,1
Sex	100,0		
Male		108	51,9
Female		100	48,1
Income	26,8		
1 to 3 Minimum wages		17	30,9
4 to 6 Minimum wages		30	54,5
≥ 7 Minimum wages		8	14,5
Skin color	99,5		
Brown ("Parda")		129	62,3
Black		18	8,7
White		60	29,0
Tendinitis	100,0		
Yes		37	17,8
No		171	82,2
Supplements Use	100,0		
Yes		112	53,8
No		96	46,2
Anabolics use	100,0		
Yes		9	4,3
No		199	95,7
Medicine use	100,0		
Yes		37	17,8
No		171	82,2
Supervised training	100,0		
Yes		199	95,7
No		9	4,3
BMI	100,0		
Appropriate weight		107	51,4
Overweight		83	39,9
Obesity		18	8,7

N: Absolute frequency; %: Relative frequency; BMI: Body mass index.

The tendinitis prevalence in the sample was of 17,8%. Of this prevalence, individuals who reported having as goal of hypertrophy had the highest prevalence of tendinitis (33.3%). Figure 1 shows the distribution of the subjects according to the prevalence of the outcome.

Figure 1. Distribution of the sample according to the prevalence of tendinitis. Vitória da Conquista, Bahia, Brazil, 2017.



The comparison of the proportions between the prevalence of tendinitis and the goals of each individual in the gym can be observed in Table II. The prevalence of tendinitis was statistically higher in individuals who reported hypertrophy as the goal of resisted training and lower in individuals reporting as goal the weight loss. There was no difference in the proportions with the third group, which reported well-being as the main objective of the training. Among those evaluated, those who answered that they are males, who use anabolics, supplements, medications and who do not train with supervision had an association with tendinitis, Table 2.

Table 2. Comparison of proportion between outcome and associated factors. Vitória da Conquista, Bahia, Brazil, 2017.

Variables	With tendinitis	Without tendinitis	p
	(n=37)	(n=171)	
	n (%)	n (%)	
Gym goal			
Hypertrophy	23 (33,3)	46 (66,7)	<0,001†
Well-being	8 (11,4)	62 (88,6)	
Weight loss	6 (8,7)	63 (91,3)	
Sex			
Male	25 (23,1)	83 (76,9)	0,036†
Female	12 (12,0)	88 (88,0)	
Income			
1 to 3 wages	3 (17,6)	14 (82,4)	0,885§
4 to 6 wages	6 (20,0)	24 (80,0)	
≥ 6 wages	1 (12,5)	7 (87,5)	
Skin color			
Brown ("Pardo")	23 (17,8)	106 (82,2)	0,463†
Black	5 (27,8)	13 (72,2)	
White	9 (15,0)	51 (85,0)	
Anabolics use			
Yes	8 (88,9)	1 (11,1)	<0,001§
No	29 (14,6)	170 (85,4)	
Supplements Use			
Yes	27 (24,1)	85 (75,9)	0,010†
No	10 (10,4)	86 (89,6)	
Medicine Use			
Yes	29 (78,4)	8 (21,6)	<0,001†
No	8 (4,7)	163 (95,3)	
Supervised training			
Yes	31 (15,6)	168 (84,4)	0,001§
No	6 (66,7)	3 (33,3)	
BMI			
Appropriate weight	15 (14,0)	92 (86,0)	0,262†
Overweight	17 (20,5)	66 (79,5)	
Obesity	5 (27,8)	13 (72,2)	

†: chi-square; §: Fisher; BMI: Body Mass Index.

Discussion

The practice of bodybuilding presents itself to the current society as one of the most searched sports' practices by the population, and this search is given by bodybuilding nowadays reaching audiences ranging from those who seek health enhancement to those who practice bodybuilding as a sports practice or esthetics⁴.

It was observed in the present study the existence of homogeneity regarding the sex of bodybuilders, where 51.9% are men. This result is similar to that found in the study of Strub⁵, where the male population that practiced bodybuilding was (43.4%) while the female population was (56.6%). Nowadays, bodybuilding gyms have changed their profile a little, since the practice of resisted exercises before was led by men, now has an equal number of women, and it is explained by factors such as the rise of women in society, ranging from their social autonomy to financial independence, the search for esthetic standards and bodybuilding to the body, in addition to the countless benefits that bodybuilding brings to both sexes⁵.

The search for bodybuilding by the Brazilian population for esthetic purposes is more evident than the search for bodybuilding as one of the phases of not assisted rehabilitation by skeletal muscle needs, sports practice or even healthy habits. It is worth highlighting that the search for esthetic purposes often goes beyond the maintenance of healthy behaviors, being able to use supplements without orientation or even use of anabolic substances. For this, the most common goals set by physical educators in the gyms are the hypertrophy and the low fat percentage where athletes seek, besides professional follow-up, the help of dietary supplements to intensify the search and reach of these results. In the affirmative above, the present study found that 53.8% of people used dietary supplements. In other studies, Manzur⁶ observed that approximately 51.7% (n = 15) reported using supplementation, and 46.7% used more than one supplement.

When observing the reports on the use of anabolics by individuals, it was verified that (95.7%) did not use and only 4.3% used these substances, similar data were found in the Silva⁷ study, where

it was identified a prevalence of 4% of anabolic users, where the most common explanation for steroid use by practitioners was for sports practice. However, these data may not correspond to reality, because the self-reports may be influenced by the embarrassment or bad acceptance and the image before society, even if the confidentiality of the research is guaranteed.

It was verified that the follow-up of the Physical Education professional is in great evidence in the gyms, where 95.7% of the surveyed reported to train with supervision, leaving only a small portion of 4.3% that reported training on their own. With the growing number of supporters of this practice, it is necessary to follow a properly qualified professional to trace the suitable conduct to achieve the objectives and thus reduce the possible risk factors for the origin of these injuries and its grievances.⁸

In our study the prevalence of tendonitis was 17.8% of the total sample, and 33.3% had tendinitis. In the Siewe study⁹, even higher rates of injuries were observed in bodybuilders, totaling 45.1% of the sample, being among the most common lesions, related with the individuals that searches for hypertrophy, where for this type of training, it is necessary to use loads above 75% of 1 RM (Maximum Repetition), predisposing certain athletes to these lesions.

In the present study, it was observed that 11.4% of individuals who searched for general well-being such as leisure and weight reduction presented tendinitis, having a lower proportion compared to those with the goal of hypertrophy. This strengthens the result discussed above, since people whose goal is well-being reduce the repetitions and the use of loads, working only at lower loads than those evaluated in the 1 MR test, thus reducing the risk of injury as well as people who wanted the goal of weight loss, of which only 8.7% had tendinitis, because training to reduce measures is based on aerobic exercises and resisted exercises of low load. The main reasons that lead people to seek the well-being are for their overall health benefits such as weight control, blood pressure, psychological stress reduction, and improved physical appearance.¹⁰

The prevalence of tendinitis in the present study was 17.8%, being more evident in individuals searching

for muscle hypertrophy training. Of these individuals, 67.5% were males and 32.4% females, data slightly approximated to those found in the Martins study¹¹, where 53% of the lesions were in male and 47% in female, thus affirming that the prevalence of lesions in men are higher than in women and hypertrophy goals are more common in the male population, which further strengthens the hypothesis that increased muscular overload predisposes these individuals to these lesions.

Regarding the professional supervision during the practice, it was possible to notice that the individuals who have supervised training, 15.6% suffered tendinitis, and 66.7% that trained without supervision presented injuries. In the studies performed by Souza¹², students who search for a personalized orientation achieve their goals in a healthier way. The results showed that the orientation of a physical education professional is important for positive and quality results during bodybuilding.

According to Menon¹³, the process of hypertrophy is directly related to the synthesis of cellular components, particularly the proteinic filaments that constitute sarcomeres, thus increasing the muscle fibers size. It is observed that with this increase of the muscle cross-section, it increases the potential of loads lifting which provides greater stress in the tendons, a fundamental characteristic for the development of tendinitis in the practitioners that aim the hypertrophy.

One of the main goals of the students in the gyms is Hypertrophy, where the individual searches to increase muscle mass. Because this gain is gradual and slow, many of the practitioners use excessive loads, increase the intake of supplements, and anabolic steroids¹⁴. According to AbdullGaffar¹⁴ various substances are used by bodybuilders and associated with steroids in order to achieve the desired physical structure, among these substances are vegetable oils, silicon, petrolatum and paraffin, causing up to 5 types of side histological reactions that have a significant impact in the general health of this athlete, being extremely important the discouragement of these athletes to the use of these substances and encourage the search for the results in a healthy way and consequently reducing the impacts on the joints by excessive loads generating important musculoskeletal injuries.

Regarding the association of tendonitis with the use of anabolic agents, medications and / or supplements, the present study found that 88.9% of the individuals that fit into this group had tendinitis. According to Seynes¹⁵ the use of anabolic agents is a risk factor for the development of musculoskeletal disorders of the most varied characteristics, such as tendinitis, due to the fact that biomechanical stress is generated in the musculoskeletal system because of the increase in the load carrying capacity of the muscle provided by the steroids.

In the present study, compared to the use of drugs by the athletes, it was verified that 78.4% of the individuals who used some type of medication had the presence of associated tendinitis. According to Van Hout¹⁶, the use of pharmacological resources by athletes is one of the main issues worldwide and in the scope of professional practice. This conduct is the cause of many controversies due to interventions by the antidoping department with punitive measures to athletes who use substances to increase sports performance. This can be observed, because these athletes who use drugs are intended to mask symptoms of some injury or to simply increase the performance in physical exercises.

We found a 24.1% association between acute tendinopathy and the use of supplements. According to Santos and Pereira¹⁷ the use of supplements can be explained by the promise of increased results in the gain of muscle mass increasing the overload in the sports practice, with this, the abusive use of these supplements is becoming more and more frequent. Van Hout¹⁶ reinforces in his study the thematic that substances such as dietary supplements and other substances that stimulate muscular development, reduction of measures in the scope of fitness, besides becoming very common among athletes, the prescriptions and the professional follow-up becomes very scarce, being an important topic to be considered by health professionals.

The association analysis showed that the variables, male gender, uncontrolled hypertrophy training and the use of anabolics, supplements and medications were associated with the presence of tendinitis. Investigating the presence of tendinitis and finding the associated factors contributes positively to the health of the athlete practicing bodybuilding, avoiding or minimizing possible factors that may

lead to the occurrence of tendon injury. The study presents some limitations such as its cross-sectional profile, which prevents causality relations, and the answers were based on self-report. However, the results pointed out, presented important statistical strength in a very representative sample, serving as the basis for the development of new sciences addressing this thematic, with a more applied methodology, such as a longitudinal study, in order to reinforce the results.

Conclusion

It was possible to conclude that tendinitis is prevalent in bodybuilder praticants mainly in those individuals that seek the hypertrophy training. Besides that, it is of fundamental importance to the reduction of the number of injuries, the practice with supervision, and without the use of external substance, since training without supervision and making use of anabolics, suplementes and medications are associated with the presence of tendinitis.

Authors' contributions

TEIXEIRA WS participated in the conception, design, search, interpretation of the results, and writing of the scientific article. LIMA LS participated in the interpretation of the data. SANTOS KT coordinated the study and participated in the study design, statistical analysis of research data, interpretation of results, and writing of the scientific article.

Competing interests

No financial, legal or political competing interests with third parties (government, commercial, private foundation, etc.) were disclosed for any aspect of the submitted work (including but not limited to grants, data monitoring board, study design, manuscript preparation, statistical analysis, etc.).

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