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ЕЖЕМЕСЯЧНЫЙ НАУЧНЫЙ ЖУРНАЛ

Медицинские новости Грузии
საქართველოს სამედიცინო სიახლენი

GEORGIAN MEDICAL NEWS

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GMN: Georgian Medical News is peer-reviewed, published monthly journal committed to promoting the science and art of medicine and the betterment of public health, published by the GMN Editorial Board since 1994. GMN carries original scientific articles on medicine, biology and pharmacy, which are of experimental, theoretical and practical character; publishes original research, reviews, commentaries, editorials, essays, medical news, and correspondence in English and Russian.

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GMN: Медицинские новости Грузии - ежемесячный рецензируемый научный журнал, издаётся Редакционной коллегией с 1994 года на русском и английском языках в целях поддержки медицинской науки и улучшения здравоохранения. В журнале публикуются оригинальные научные статьи в области медицины, биологии и фармации, статьи обзорного характера, научные сообщения, новости медицины и здравоохранения. Журнал индексируется в MEDLINE, отражён в базе данных SCOPUS, PubMed и ВИНТИ РАН. Полнотекстовые статьи журнала доступны через БД EBSCO.

GMN: Georgian Medical News – საქართველოს სამედიცინო სიახლენი – არის ყოველთვიური სამეცნიერო სამედიცინო რეცენზირებადი ჟურნალი, გამოიცემა 1994 წლიდან, წარმოადგენს სარედაქციო კოლეგიისა და აშშ-ის მეცნიერების, განათლების, ინდუსტრიის, ხელოვნებისა და ბუნებისმეტყველების საერთაშორისო აკადემიის ერთობლივ გამოცემას. GMN-ში რუსულ და ინგლისურ ენებზე ქვეყნდება ექსპერიმენტული, თეორიული და პრაქტიკული ხასიათის ორიგინალური სამეცნიერო სტატიები მედიცინის, ბიოლოგიისა და ფარმაციის სფეროში, მიმოხილვითი ხასიათის სტატიები.

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WEBSITE

www.geomednews.com

К СВЕДЕНИЮ АВТОРОВ!

При направлении статьи в редакцию необходимо соблюдать следующие правила:

1. Статья должна быть представлена в двух экземплярах, на русском или английском языках, напечатанная через **полтора интервала на одной стороне стандартного листа с шириной левого поля в три сантиметра**. Используемый компьютерный шрифт для текста на русском и английском языках - **Times New Roman (Кириллица)**, для текста на грузинском языке следует использовать **AcadNusx**. Размер шрифта - **12**. К рукописи, напечатанной на компьютере, должен быть приложен CD со статьей.

2. Размер статьи должен быть не менее десяти и не более двадцати страниц машинописи, включая указатель литературы и резюме на английском, русском и грузинском языках.

3. В статье должны быть освещены актуальность данного материала, методы и результаты исследования и их обсуждение.

При представлении в печать научных экспериментальных работ авторы должны указывать вид и количество экспериментальных животных, применявшиеся методы обезболивания и усыпления (в ходе острых опытов).

4. К статье должны быть приложены краткое (на полстраницы) резюме на английском, русском и грузинском языках (включающее следующие разделы: цель исследования, материал и методы, результаты и заключение) и список ключевых слов (key words).

5. Таблицы необходимо представлять в печатной форме. Фотокопии не принимаются. **Все цифровые, итоговые и процентные данные в таблицах должны соответствовать таковым в тексте статьи**. Таблицы и графики должны быть озаглавлены.

6. Фотографии должны быть контрастными, фотокопии с рентгенограмм - в позитивном изображении. Рисунки, чертежи и диаграммы следует озаглавить, пронумеровать и вставить в соответствующее место текста **в tiff формате**.

В подписях к микрофотографиям следует указывать степень увеличения через окуляр или объектив и метод окраски или импрегнации срезов.

7. Фамилии отечественных авторов приводятся в оригинальной транскрипции.

8. При оформлении и направлении статей в журнал МНГ просим авторов соблюдать правила, изложенные в «Единых требованиях к рукописям, представляемым в биомедицинские журналы», принятых Международным комитетом редакторов медицинских журналов - <http://www.spinesurgery.ru/files/publish.pdf> и http://www.nlm.nih.gov/bsd/uniform_requirements.html В конце каждой оригинальной статьи приводится библиографический список. В список литературы включаются все материалы, на которые имеются ссылки в тексте. Список составляется в алфавитном порядке и нумеруется. Литературный источник приводится на языке оригинала. В списке литературы сначала приводятся работы, написанные знаками грузинского алфавита, затем кириллицей и латиницей. Ссылки на цитируемые работы в тексте статьи даются в квадратных скобках в виде номера, соответствующего номеру данной работы в списке литературы. Большинство цитированных источников должны быть за последние 5-7 лет.

9. Для получения права на публикацию статья должна иметь от руководителя работы или учреждения визу и сопроводительное отношение, написанные или напечатанные на бланке и заверенные подписью и печатью.

10. В конце статьи должны быть подписи всех авторов, полностью приведены их фамилии, имена и отчества, указаны служебный и домашний номера телефонов и адреса или иные координаты. Количество авторов (соавторов) не должно превышать пяти человек.

11. Редакция оставляет за собой право сокращать и исправлять статьи. Корректур авторам не высылаются, вся работа и сверка проводится по авторскому оригиналу.

12. Недопустимо направление в редакцию работ, представленных к печати в иных издательствах или опубликованных в других изданиях.

При нарушении указанных правил статьи не рассматриваются.

REQUIREMENTS

Please note, materials submitted to the Editorial Office Staff are supposed to meet the following requirements:

1. Articles must be provided with a double copy, in English or Russian languages and typed or computer-printed on a single side of standard typing paper, with the left margin of 3 centimeters width, and 1.5 spacing between the lines, typeface - **Times New Roman (Cyrillic)**, print size - 12 (referring to Georgian and Russian materials). With computer-printed texts please enclose a CD carrying the same file titled with Latin symbols.

2. Size of the article, including index and resume in English, Russian and Georgian languages must be at least 10 pages and not exceed the limit of 20 pages of typed or computer-printed text.

3. Submitted material must include a coverage of a topical subject, research methods, results, and review.

Authors of the scientific-research works must indicate the number of experimental biological species drawn in, list the employed methods of anesthetization and soporific means used during acute tests.

4. Articles must have a short (half page) abstract in English, Russian and Georgian (including the following sections: aim of study, material and methods, results and conclusions) and a list of key words.

5. Tables must be presented in an original typed or computer-printed form, instead of a photocopied version. **Numbers, totals, percentile data on the tables must coincide with those in the texts of the articles.** Tables and graphs must be headed.

6. Photographs are required to be contrasted and must be submitted with doubles. Please number each photograph with a pencil on its back, indicate author's name, title of the article (short version), and mark out its top and bottom parts. Drawings must be accurate, drafts and diagrams drawn in Indian ink (or black ink). Photocopies of the X-ray photographs must be presented in a positive image in **tiff format**.

Accurately numbered subtitles for each illustration must be listed on a separate sheet of paper. In the subtitles for the microphotographs please indicate the ocular and objective lens magnification power, method of coloring or impregnation of the microscopic sections (preparations).

7. Please indicate last names, first and middle initials of the native authors, present names and initials of the foreign authors in the transcription of the original language, enclose in parenthesis corresponding number under which the author is listed in the reference materials.

8. Please follow guidance offered to authors by The International Committee of Medical Journal Editors guidance in its Uniform Requirements for Manuscripts Submitted to Biomedical Journals publication available online at: http://www.nlm.nih.gov/bsd/uniform_requirements.html
http://www.icmje.org/urm_full.pdf

In GMN style for each work cited in the text, a bibliographic reference is given, and this is located at the end of the article under the title "References". All references cited in the text must be listed. The list of references should be arranged alphabetically and then numbered. References are numbered in the text [numbers in square brackets] and in the reference list and numbers are repeated throughout the text as needed. The bibliographic description is given in the language of publication (citations in Georgian script are followed by Cyrillic and Latin).

9. To obtain the rights of publication articles must be accompanied by a visa from the project instructor or the establishment, where the work has been performed, and a reference letter, both written or typed on a special signed form, certified by a stamp or a seal.

10. Articles must be signed by all of the authors at the end, and they must be provided with a list of full names, office and home phone numbers and addresses or other non-office locations where the authors could be reached. The number of the authors (co-authors) must not exceed the limit of 5 people.

11. Editorial Staff reserves the rights to cut down in size and correct the articles. Proof-sheets are not sent out to the authors. The entire editorial and collation work is performed according to the author's original text.

12. Sending in the works that have already been assigned to the press by other Editorial Staffs or have been printed by other publishers is not permissible.

**Articles that Fail to Meet the Aforementioned
Requirements are not Assigned to be Reviewed.**

ავტორთა საქურაღებოლ!

რედაქციაში სტატიის წარმოდგენისას საჭიროა დაიცვათ შემდეგი წესები:

1. სტატია უნდა წარმოადგინოთ 2 ცალად, რუსულ ან ინგლისურ ენებზე დაბეჭდილი სტანდარტული ფურცლის 1 გვერდზე, 3 სმ სიგანის მარცხენა ველისა და სტრიქონებს შორის 1,5 ინტერვალის დაცვით. გამოყენებული კომპიუტერული შრიფტი რუსულ და ინგლისურენოვან ტექსტებში - **Times New Roman (Кириллица)**, ხოლო ქართულენოვან ტექსტში საჭიროა გამოვიყენოთ **AcadNusx**. შრიფტის ზომა – 12. სტატიას თან უნდა ახლდეს CD სტატიით.

2. სტატიის მოცულობა არ უნდა შეადგენდეს 10 გვერდზე ნაკლებს და 20 გვერდზე მეტს ლიტერატურის სიის და რეზიუმეების (ინგლისურ, რუსულ და ქართულ ენებზე) ჩათვლით.

3. სტატიაში საჭიროა გაშუქდეს: საკითხის აქტუალობა; კვლევის მიზანი; საკვლევი მასალა და გამოყენებული მეთოდები; მიღებული შედეგები და მათი განსჯა. ექსპერიმენტული ხასიათის სტატიების წარმოდგენისას ავტორებმა უნდა მიუთითონ საექსპერიმენტო ცხოველების სახეობა და რაოდენობა; გაუტკივარებისა და დაძინების მეთოდები (მწვავე ცდების პირობებში).

4. სტატიას თან უნდა ახლდეს რეზიუმე ინგლისურ, რუსულ და ქართულ ენებზე არანაკლებ ნახევარი გვერდის მოცულობისა (სათაურის, ავტორების, დაწესებულების მითითებით და უნდა შეიცავდეს შემდეგ განყოფილებებს: მიზანი, მასალა და მეთოდები, შედეგები და დასკვნები; ტექსტუალური ნაწილი არ უნდა იყოს 15 სტრიქონზე ნაკლები) და საკვანძო სიტყვების ჩამონათვალი (key words).

5. ცხრილები საჭიროა წარმოადგინოთ ნაბეჭდი სახით. ყველა ციფრული, შემაჯამებელი და პროცენტული მონაცემები უნდა შეესაბამებოდეს ტექსტში მოყვანილს.

6. ფოტოსურათები უნდა იყოს კონტრასტული; სურათები, ნახაზები, დიაგრამები - დასათაურებული, დანომრილი და სათანადო ადგილას ჩასმული. რენტგენოგრამების ფოტოასლები წარმოადგინეთ პოზიტიური გამოსახულებით **tiff** ფორმატში. მიკროფოტოსურათების წარწერებში საჭიროა მიუთითოთ ოკულარის ან ობიექტივის საშუალებით გადიდების ხარისხი, ანათალების შედეგის ან იმპრეგნაციის მეთოდი და აღნიშნოთ სურათის ზედა და ქვედა ნაწილები.

7. სამამულო ავტორების გვარები სტატიაში აღინიშნება ინიციალების თანდართვით, უცხოურისა – უცხოური ტრანსკრიპციით.

8. სტატიას თან უნდა ახლდეს ავტორის მიერ გამოყენებული სამამულო და უცხოური შრომების ბიბლიოგრაფიული სია (ბოლო 5-8 წლის სიღრმით). ანბანური წყობით წარმოდგენილ ბიბლიოგრაფიულ სიაში მიუთითეთ ჯერ სამამულო, შემდეგ უცხოელი ავტორები (გვარი, ინიციალები, სტატიის სათაური, ჟურნალის დასახელება, გამოცემის ადგილი, წელი, ჟურნალის №, პირველი და ბოლო გვერდები). მონოგრაფიის შემთხვევაში მიუთითეთ გამოცემის წელი, ადგილი და გვერდების საერთო რაოდენობა. ტექსტში კვადრატულ ფხიხლებში უნდა მიუთითოთ ავტორის შესაბამისი N ლიტერატურის სიის მიხედვით. მიზანშეწონილია, რომ ციტირებული წყაროების უმეტესი ნაწილი იყოს 5-6 წლის სიღრმის.

9. სტატიას თან უნდა ახლდეს: ა) დაწესებულების ან სამეცნიერო ხელმძღვანელის წარდგინება, დამოწმებული ხელმოწერითა და ბეჭდით; ბ) დარგის სპეციალისტის დამოწმებული რეცენზია, რომელშიც მითითებული იქნება საკითხის აქტუალობა, მასალის საკმაობა, მეთოდის სანდოობა, შედეგების სამეცნიერო-პრაქტიკული მნიშვნელობა.

10. სტატიის ბოლოს საჭიროა ყველა ავტორის ხელმოწერა, რომელთა რაოდენობა არ უნდა აღემატებოდეს 5-ს.

11. რედაქცია იტოვებს უფლებას შეასწოროს სტატია. ტექსტზე მუშაობა და შეჯერება ხდება საავტორო ორიგინალის მიხედვით.

12. დაუშვებელია რედაქციაში ისეთი სტატიის წარდგენა, რომელიც დასაბეჭდად წარდგენილი იყო სხვა რედაქციაში ან გამოქვეყნებული იყო სხვა გამოცემებში.

აღნიშნული წესების დარღვევის შემთხვევაში სტატიები არ განიხილება.

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MEDICAL AND SOCIAL ASPECTS OF PREVENTING SPORTS INJURIES AMONG CHILDREN AND ADOLESCENTS

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Abstract.

Sports injuries among children and adolescents typically involve mild bruises and sprains. However, any sport can cause injuries to the musculoskeletal system. It is crucial to prevent such injuries through proper training and supervision to ensure the safety of young athletes. Therefore, when providing medical care to these patients, physicians must have the appropriate qualifications and skills and take into account the specific nature and location of injuries in each sport. Training programs and performance standards for young athletes should consider participants' biological age, physical and psychological immaturity, rather than their chronological age to prevent serious musculoskeletal injuries in child and youth sports.

This review outlines the incidence of sports injuries in adolescents and considers how biological and social factors (factors related to coaches, peers and parents), influence the incidence and nature of injuries in different sports. Coaches and parents, though, have the ability to reduce the risk of injury by selecting suitable sports activities, employing the right equipment, enforcing rules, promoting safe playing conditions, and ensuring adequate supervision. Healthcare providers involved in the prevention and treatment of injuries in young athletes must possess the skillset to diagnose and assess the severity and risk to the athlete's future health and performance.

Key words. Physical activity test, childhood injury, sports injury, young athletes, questionnaire survey.

Introduction.

There has been an increased incidence of sports-related injuries as children become more involved in organized sports and specialize in specific sports at an early age. Children often suffer from acute traumatic injuries that occur during training and competition, as well as chronic injuries that result from high-intensity exertion, which are presented to be secondary to repetitive strain. The distinct characteristics of a developing child's body necessitate an alternative method for identifying, prognosing, and treating sports injuries when compared to adult athletes [1,2].

Sports involvement among youths is on the rise in the United States and worldwide, mainly caused by early specialization in one sport prior to adolescence. The transition to specialized sports leads to higher frequency and intensity of training, increased risks of overtraining, nutritional deficits, and injuries, especially for those participating in endurance sports. High-risk groups, such as young runners and swimmers, require specialized attention to training schedules, diet, and injuries. Proper planning of training, allocation of rest time, and education on nutrition can aid in the prevention of sports-related injuries in children and adolescents [3].

Materials and Methods.

• Information Sources

A review of the literature was carried out by searching the relevant articles in the electronic databases in the English and Russian languages, which included eLIBRARY, Google Scholar, PubMed, along with the references mentioned in these articles.

• Literature search strategy

Search terms for the analysis included: «adolescents AND sports-related injuries», «physical activity AND adolescents», «sports injuries AND adolescents», «children sports injuries AND social factors», «children sports injuries AND biological factors», «incidence of child sports-related injuries AND parents», «incidence of child sports-related injuries AND coaches», «incidence of child sports-related injuries AND peers», «incidence of child sports-related injuries AND healthcare providers», «musculoskeletal system growth AND sports injuries in school-aged children», «bone injuries AND school years», «young athletes\adolescents AND sports-related injuries».

• Eligibility Criteria

The analysis included only articles meeting the following criteria:

- Publication date no earlier than 1992.
- Covers classifications of sports injuries in adolescents.
- Describes the various biological and social factors that influence the occurrence of sports injuries in children.
- Description of the relationship between musculoskeletal growth and sports injuries in school-age children.

The analysis was carried out by two independent operators in several stages. Initially, the title and abstract of the article were reviewed to assess its relevance to the present review. Then, the operators proceeded to extract the required information from the full text (Figure 1).

28 were obtained from PubMed, 47 were retrieved from eLIBRARY, and 101 were retrieved from Google Scholar. The final number of included studies after applying the inclusion criteria was 52. These articles cover a range of topics related to sports injuries in children, including classification of such injuries in schoolchildren, the influence of biological and social factors on their occurrence, and the relationship between musculoskeletal growth and sports injuries in school-age children.

Discussion.

1. Children sports activity. Risks of early sport specialization.

The age group most susceptible to sports injuries is 5-9 years old. It is recommended to implement preventive measures during daily activities under parental supervision at home, in

addition to coaches, caregivers, and teachers in preschools and schools providing increased monitoring at school and sports clubs. Sports fields and recreational facilities pose the most significant threat of humerus fractures amongst preschool and lower elementary school children [4]. Therefore, it is essential to work collaboratively with healthcare providers, athletes, parents, and coaches to develop suitable interventions that guarantee the safety of young athletes [5].

In the United States, almost 72% of school-aged children (69% of girls and 75% of boys aged 8 to 17 years) engage in at least one athletic activity, resulting in nearly 29 million youth participating in organized sports. Similarly, sports participation rates are on the rise globally among children of all ages. Participation in sports is acknowledged to yield numerous advantages such as healthy habits, positive self-perception, and enhanced social interactions. In conjunction with elevated engagement in sports, it is now believed that sport specialization, encompassing year-round physical training, involvement in multiple teams within the same sport, and concentrated participation in a single sport, can yield record-breaking level. Youth sport specialization, characterized by intensive year-round training in a single sport, has become increasingly prevalent, with almost 30% of young athletes highly specialized. The desire for scholarships, professional contracts, or talent recognition by parents, coaches, and the media seems to be the driving forces behind this trend. Many coaches, parents, and children hold the idea that developing an elite athlete is best achieved through exclusive participation in a single sport at an early age, year-round [6,7].

The specialization in individual sports was initially documented in Eastern Europe, where athletes competed in activities such as gymnastics, swimming, diving, and figure skating. International Olympic sports have likely led to an increase in sport specialization. As a result, processes for selecting future champions and implementing specialized training have reached elementary school grades. Programs that aim to develop future champions typically involve intensive and high-intensity training, along with rigorous coaching that often comes with parental pressure for results. The success of Olympic development programs and the allure of professional contracts may guide young athletes to focus on a single sport at an earlier age, even though only 0.2% to 0.5% of high school athletes ever attain a professional level [7].

This is why early sport specialization is presently a matter of concern. Concerns about the suitable age to commence sport and the associated risks and benefits of sport type participation have been raised. The Sport Participation Development Model, established by Côté and colleagues, furnishes a blueprint for dissimilar pathways of sport involvement, most notably early selection as a foundation for sport participation (both elite and recreational) [7].

One approach to reducing early sport injuries in young children is to delay the commencement of high-intensity training until middle or late adolescence. Specializing in sports can also result in burnout, social isolation, and early disengagement from sports. Early sport specialization can result in injury and dropout, as well as sedentary lifestyles and an increased risk of overweight. This may ultimately lead to reduced enjoyment of physical activity during youth, potentially resulting in long-term consequences in adulthood [7].

Early sport specialization may deprive youth of opportunities to participate in various sports seasons throughout the year, leading to a loss of lifelong sport skill development. This absence of purposeful physical activity in youth is likely to contribute to deficits in current and long-term physical activity and health. Specifically, early sport specialization may result in reduced motor skill development. A decrease in motor skill proficiency can happen when young athletes concentrate on the skills they require for their sport and neglect the ones developed for a diverse group of players. As young athletes progress in their performance, their chances to engage in other sports keep reducing. The lower participation in other sports might be attributed to factors such as parental or coaching pressure, inconvenient schedules, conflicts, and loss of interest. Additional coaching pressure may exist to encourage young athletes to specialize in one particular sport early on, often with the promise of more opportunities. However, if sport specialization occurs too early during adolescence, it may suppress the comprehensive development of motor skills, increasing the risk of future injuries and potentially reducing the child's ability to achieve optimal athletic performance [7,8].

2. The epidemiological approach in sports injury.

The epidemiological approach in sports injury medicine aims to measure the frequency of sports injuries based on the individuals affected, location and timing of the injury, and its outcomes (descriptive approach). Additionally, efforts are made to delve into the causes and mechanisms behind these injuries and develop strategies to reduce their occurrence and prevention (analytical approach). Preventing sports injuries in children and adolescents is crucial in mitigating the short- and long-term social and economic impacts [9]. The epidemiological approach posits that injuries do not happen randomly.

Studies that concentrate on individual sports like skiing, baseball, speed skating, tennis, or gymnastics share alike conclusions regarding sports injury risks. Several recommendations aid in reducing sports injuries among children and youths. For instance, Sports Coach UK. In endurance sports, the '10 percent rule' should be followed, which suggests increasing activity by 10 percent per week to avoid overuse injuries. In order to prevent sports injuries in children and young people, the development

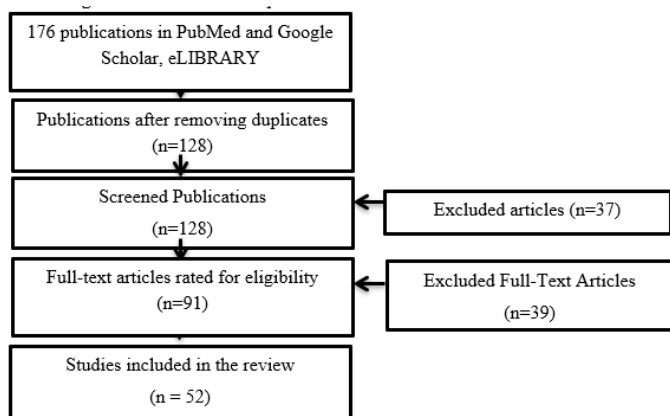


Figure 1. Article selection process.

of exercise programs that take into account the weight and height of the child, proper coaching supervision and the use of appropriate equipment is recommended [10,11]. Limiting external pressure from parents and coaches is advisable.

Furthermore, pre-training screening can be used to predict ankle injury, with the goal of reducing participation for children who are most susceptible to injury. Preventative measures rely on evaluating necessary levels of physical fitness, flexibility, and overall health. These factors should be properly assessed to provide appropriate recommendations for maintaining or improving physical fitness. Additionally, implementing pre-season training can effectively reduce injuries at the start of the season [12].

3. Sport-injury prevention.

Injury prevention can effectively reduce the incidence of quadriplegia in American soccer by banning javelin kicks and implementing appropriate head and face protection in ice hockey. Proper ball selection, limiting repetitive activities like throwing and bowling, and having sound drinking habits are also helpful in this regard. Despite these measures, not all interventions are entirely successful. For instance, while protective bibs in baseball do offer additional protection, instances of cardiac damage are still reported [13,14].

To minimize the social and economic impact of physical activity injuries in the short and long term, the prevention of physical activity injuries is an important goal. A sequential prevention model has been developed to address physical activity injuries at various stages. The model consists of four stages: firstly, defining the frequency and severity of injuries resulting from physical activities, secondly, identifying risk factors and injury mechanisms that contribute to the incidence of such injuries, thirdly, introducing interventions that can reduce the incidence and severity of physical activity injuries, fourthly, conducting a randomized controlled trial [15] to evaluate their effectiveness.

One recommended strategy for preventing pediatric sports injuries is to incorporate mandatory short breaks into a sports training regimen. The optimal training regimen suggests limiting training days to no more than five per week and taking a break from training for 2 to 4 consecutive months per year, depending on the specific sport and position within the team [16].

However, most prevention interventions recommended in literature rely on descriptive studies without considering the predictive risk factors of injuries identified in correlational or experimental studies. Risk factors for sports injuries are not only associated with children's physical development but also with sport-specific injury risks. Analytical data indicate a relationship between specific risk factors and injury, allowing for the degree of sports injuries predictability to be established. This is a crucial development for the establishment and development of prevention methods. Medical interventions using tapes or bandages on injured areas during training can prevent sports injuries in children and adolescents. This leads to a reduction in re-injury. In order to develop preventative interventions, tools or procedures are tested on non-injured athletes and the resulting reduction in injury risk is recorded [10,16].

While some countries have tried to establish protocols to prevent childhood injuries, most only include preventive measures for sports injuries as a subsection within the general block. One

can find various subsections, including injury prevention during traffic accidents, on the street, and when communicating with strangers. However, these do not cater to the needs of children, parents, coaches, and medical personnel [17].

The significant didactic dilemma of arranging physical activity for children and adolescents remains. One component of preventing sports injuries among schoolchildren is the professional competence of teachers, who must organize functional motor skills training to enhance physical literacy among children and adolescents. Students should become proficient in a wide range of functional motor skills, including an interest and motivation for physical education, orientation towards physical fitness goals and levels. There is no question that curriculum customization is essential to mitigating the high injury rates experienced by youth in physical education classes. Inactive students, who are unfamiliar with exercise, possess low self-efficacy, poor skills, and a lack of physical fitness, are at risk for PE injuries. Conversely, active students exhibit a greater tendency to experience recurring old injuries or develop new ones due to high activity levels that increase injury risks [18,19].

There is a clear divide between the appropriateness of children and teens for participating in sports. Thus, teaching physical education becomes a more intricate undertaking than just arranging classes according to various fitness levels and students' inclination towards sports injuries. The number of adolescents diagnosed with physical inactivity disorders is increasing. They are similar to the adult category of "active couch potatoes" [20,21].

Adolescents' physical activity during free time does not guarantee their superiority in functional motor skills in all situations. In fact, being specialized in one or two sports could increase the risk of injury in other contexts. Given this, actively improving motor skills, proper technique, and correcting maladaptive movement patterns are critical for both active and inactive adolescents. Sedentary individuals may require improved flexibility and strengthening exercises to promote proper movement. For highly active individuals, reducing compensatory movements resulting from prior injuries can be beneficial [22].

Children who engage in sports for more hours per week than their peers, spend over 16 hours weekly in intense training, and specialize in sports participation require close monitoring for burnout, overuse, injury, or potential decreased performance resulting from overtraining. Children and teenagers who specialize in one sport should incorporate periods of isolated and focused training to enhance the development of various motor skills and decrease risk factors for injury [7].

It is crucial to comprehend the significance of protection and rest and recognize the factors that increase the susceptibility to injuries. For instance, if low bone density is detected, mandatory treatment is imperative. Similarly, if biomechanical issues are observed, unsuitable footwear and training are identified, necessitating specialized rehabilitation [15,40].

Future research on sports injury prevention in children and adolescents should focus on these three key areas [16,41].

1. A significant number of severe contact injuries occur during competitions

2. A high incidence of fractures in young players.
3. The state of maturation and growth spurts also play a role.

According to authors' preliminary estimates, injury prevention measures can reduce sports injuries attributed to force loads by less than a third, while injuries associated with overtraining can be reduced nearly two-fold [13,42].

The prevention of sports injuries in children and adolescents is important, and foreign measures in this area are intriguing. One such measure is the nationwide partnership program known as "RugbySmart", developed to prevent injuries in rugby. Since 2001, this program has facilitated mandatory injury prevention training for coaches and referees. Much of the guidance provided by RugbySmart is devoted to preparing players for the physical challenges of the sport. This includes the level of competency of the athlete, how best to safely and effectively develop skills necessary for contact elements of the game, and handling injuries when they happen. Recognizing and managing concussions is a crucial part of RugbySmart [1,42]. The program's advances can be applied to any other sport.

When devising preventative measures, past injuries must be taken into account. For instance, there is a correlation between restricted ankle mobility and shoulder damage. In other words, an ankle injury can heighten the possibility of developing further shoulder injuries. The biomechanical relationship demonstrated in baseball players is unequivocally clear. During overhead throwing, the kinetic chain operates sequentially, with maximal energy generation occurring in the lower extremities before being transferred to the shoulder [2,4,43]. Unfortunately, ankle pathology can impede this chain, resulting in excessive shoulder loading, albeit necessary for performance optimization. A previous study suggested that tennis players with shoulder problems commonly reported a history of ankle ligament sprain during the history-taking and examination process. As a result, it is advisable to conduct stability tests on the lower extremities during the physical examination of patients [17,44].

Athletes diagnosed with Osgood-Schlatter disease often exhibit low levels of vitamin D, copper, ionized calcium, phosphorus, zinc, and elevated alkaline phosphatase levels. There is a reduction in certain amino acids, including lysine, threonine, glycine, cysteine, arginine, glutamic acid, asparagine, leucine, glutamine, and ornithine in the blood serum of athletes with Osgood-Schlatter disease. This reduction should be considered when creating nutritional support programs for athletes. A study shows that the measurement of lipid peroxidation product levels in serum can be a useful screening parameter for Osgood-Schlatter disease, as these changes correlate with ultrasound and clinical data [21,45].

In order to establish a comprehensive system of pediatric traumatological care that encompasses outpatient and emergency medical care, specialized inpatient care, and rehabilitation following basic treatment, it is essential to consider existing trends affecting children between the ages of 0 and 17, in addition to morbidity indicators. These trends can be utilized to evaluate expectations for the next several years [22,46,47].

The concept of "sport selection" is often viewed as merely selecting individuals for sports rather than selecting sports that are suitable for them. As a result, this notion can be

dehumanizing and take on an "anti-human" connotation. One solution is to establish a new subsystem within the worldwide selection system that permits "eliminated" children to remain in the realm of physical culture and sport. This involves transferring children with developed athletic abilities to other sports, thereby "re-profiling" or "reorienting" them. When implementing such a system, it is important to consider how a young athlete can overcome a state of "lack of perspective," which is recognized by those around them. One possible solution to this challenge is the use of humanitarian technologies that create conditions for the athlete to independently decide to pursue another sport [4-9,48].

Preventing muscle injuries and diseases in sports requires adherence to specific guidelines. During training, physical loads should not exceed the functional capabilities of a young athlete's musculoskeletal system. Training loads must correspond to an athlete's fitness and age to avoid neuromuscular overload and overwork. Before each training and competition, a thorough warm-up is necessary. It is important to carry out a warm-up. In every instance, collaboration between the sports physician and coach is essential since they are responsible for enhancing sports technique and preparing for training and competition. When it comes to the aftermath of incorrect loading, the doctor's expertise is particularly important in promptly identifying already known causes of recurring micro-injuries in young athletes and providing necessary treatment. Irrational training methods often lead to tendon and ligament overuse. This condition frequently results in pain and can impede the training of young athletes. The investigation of diverse forms of pathological processes that manifest in tendons, peritendinous tissue, and at sites where tendon fibers are intertwined with periosteum and bone, alongside examinations of local blood circulation and ultrastructural changes, has fostered the development of rational techniques for conservative and surgical treatment aimed at promptly restoring athletes to their previous athletic performance levels [19,49].

WHO Growth Standards for children aged 0-5 currently exist and can be found in AnthroPlus. AnthroPlus includes three applicable indicators: anthropometric calculator, individual assessment, and nutritional review. These indicators are part of the WHO AnthroPlus software for global application of the 2007 WHO Handbook for Growth Monitoring in School-Age Children and Adolescents [4,50,51]. They can be used to create preventive interventions that prevent sports injuries in children and adolescents.

Additionally, electronic medical portals with essential medical data regarding each athlete's injuries and treatment outcomes can be utilized. A systematic analysis of the portal data facilitates prompt response to players' injuries, monitoring of their treatment and rehabilitation, and the development of injury prevention programs [5,52].

4. Physical tests and assays.

Japan has amended the School Health and Safety Law to recognize children's musculoskeletal ailments and treat them early on, ensuring their healthy development. This is influenced by the Bone and Joint Japan program, implemented in 2014 to diagnose musculoskeletal disorders in school-aged

children [23]. Since 2016, Japanese schools have circulated a survey to parents to detect potential musculoskeletal disorders in their children, who are subsequently referred for medical examination.

Although early diagnosis and treatment of musculoskeletal disorders are essential for healthy development, there is a scarcity of systematic reports on musculoskeletal examinations among school-age children [24,25].

Presently, physical fitness tests and musculoskeletal examinations are performed separately. Active musculoskeletal physical examination of young athletes during physical fitness testing can enhance the accuracy of diagnosing motor dysfunction and facilitate early injury treatment [26].

In addition to the Bone and Joint Japan questionnaire, the School Health Society questionnaire can also be utilized for preventing school sports injuries. This serves as a method for musculoskeletal assessment, which can be carried out effectively by a school nurse who lacks specialization in orthopedics yet is constrained by time. The child's parents are able to complete the questionnaire. The school physician conducts a physical evaluation to ascertain if any irregularities listed on the survey are present.

All Japanese elementary and junior high school students participate in an annual physical fitness assessment, which is a routine school activity implemented in compliance with the guidelines established by the Japan Sports Agency. The gender-based evaluation includes a set of physical indicators, namely: grip strength (measuring muscular strength), squatting (measuring muscular endurance), forward trunk bending (aka sitting trunk bending, measuring flexibility), sidestep (measuring agility), 20-meter shuttle run (measuring cardiopulmonary endurance), 50-meter run (measuring instantaneous strength), standing long jump (measuring instantaneous strength), and softball throw (measuring instantaneous movement) [26].

In Portugal, researchers can gather data on injury profiles and levels of sports participation for children using the LESADO and RAPIL II questionnaires. LESADO is a self-administered survey that captures information on injury profiles. Its development was guided by an extensive literature review, and it was adapted from epidemiological surveys used in Portuguese sports samples [27,28]. A precise definition of injury and selected variables was provided, based on current epidemiological studies, [29,30] and can be found in previous research [27,28]. A six-month time frame was used, in line with recommendations from retrospective studies [31].

Biosocial variables were measured using the parent self-assessment instrument, RAPIL II questionnaire. It is noteworthy that this method has been executed in substantial epidemiological investigations conducted in Portugal [32] and provides insights into the daily physical activity routines of kids and teenagers.

The assessments that incorporate musculoskeletal maturity measures necessitate the utilization of the Tanner-Whitehouse III (TW3) technique to establish bone age [33]. A forecast from radiographs of the left palm and wrist is employed to this end [34].

5. Sport-related traumatic brain injuries in children.

Children and teenagers are exposed to a high risk of concussion while taking part in sports. Because each concussion in children

and adolescents presents a unique spectrum and severity of symptoms, it is necessary to provide individualized treatment aimed at reducing physical and cognitive activity rather than necessarily eliminating it. The return to activity and/or sport is accomplished through a step-by-step program assessing symptom recurrence. Understanding the duration of symptoms and complications is crucial for the treating physician to determine the appropriate timing for specialist referral. More research is necessary to diagnose and treat sports-related concussions in children and adolescents [35,36].

Previous studies on the prevention of concussions in sports and recreation-related traumatic brain injuries (SRR-TBIS) have primarily concentrated on the efficacy of sports protective equipment such as helmets and mouthguards in soccer and ice hockey [37].

Strategies to prevent sports-related concussions include changing the competitive mindset, educating athletes about concussions, modeling and reinforcing safe play. Recommendations for prevention also encompass ensuring that children adhere to safety regulations during practice by wearing appropriate protective gear at all times. Additionally, if an athlete exhibits symptoms suggesting a concussion, they should be suspended from play and not return until medically cleared. Children need extended recovery times and more cautious treatment methods [38].

Additionally, parents and educators should encourage unrestricted playtime to enhance their motor skill development during their formative years, potentially decreasing the likelihood of injury during adolescence. Encouraging youth to participate in different sports during their formative years can positively impact their motor skill development and help them identify sports they enjoy. It is recommended to follow a defined training algorithm when engaging in any sport [39].

Conclusion.

Thus, the medico-social aspects of preventing sports injuries in children and adolescents involve utilizing physical fitness tests in conjunction with school screenings for timely detection of musculoskeletal disorders. Furthermore, an evaluation utilizing musculoskeletal disorder screening and physical fitness testing is a viable tool for detecting early stages of musculoskeletal disorders. Children should participate in a variety of sports according to their ability and interests to fully benefit from sport's physical, psychological, and social advantages. It is thus advised to vary sport participation levels, avoiding early specialization in one sport. Early sport specialization before adulthood may result in a lack of age-appropriate athletic abilities among children, particularly when they do not engage in as much unstructured free play as their peers. Without the chance to participate in various sports, children may not fully develop neuromuscular structures that can safeguard against injury. To avoid sports specialization, there are several alternative solutions, such as a range of options for developing motor skills in adulthood, in addition to planned integrative neuromuscular training, that can help to enhance the chances for success in young athletes. Additional opportunities in physical education can expose youth to a range of sports, increasing chances of identifying sports with high potential for success and

enjoyment. It is important for parents, teachers, and coaches to support all prevention activities.

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РЕЗЮМЕ
МЕДИКО-СОЦИАЛЬНЫЕ АСПЕКТЫ
ПРОФИЛАКТИКИ СПОРТИВНОГО ТРАВМАТИЗМА
СРЕДИ ДЕТЕЙ И ПОДРОСТКОВ

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Спортивные травмы у детей и подростков чаще ограничиваются легкими ушибами и растяжениями. Любой вид спорта может привести к травмам опорно-двигательного аппарата. Следовательно, при оказании медицинской помощи таким пациентам врачи должны обладать соответствующими квалификационными знаниями и навыками, учитывать конкретный характер и локализацию травм в каждом виде спорта. Программы тренировок и стандарты производительности юных спортсменов должны учитывать биологический возраст участников, а также их физическую и психологическую незрелость в большей степени, чем их хронологический возраст. Чтобы избежать серьезных повреждений опорно-двигательного аппарата при занятии детским и юношеским спортом, необходимы глубокие знания различных аспектов тренировок, включая продолжительность, интенсивность, частоту и восстановление. Травма является неотъемлемым риском при занятиях спортом и, в определенной степени, должна рассматриваться как неизбежная плата высокоинтенсивных спортивных тренировок и соревнований для достижения результата. Тем не менее, тренеры и родители могут минимизировать риск травм, обеспечивая правильный выбор спортивных мероприятий, используя соответствующее оборудование, соблюдая правила, используя безопасные условия игры и обеспечивая надлежащий надзор. Хотя травмы у юных спортсменов бывают устойчивыми, важно сбалансировать негативные последствия спортивных травм со многими социальными, психологическими и медицинскими преимуществами, которые приносит серьезная приверженность спорту.

Ключевые слова: тест физической активности, детский травматизм, спортивный травматизм, юные спортсмены, анкетирование

რეზიუმე

ბავშვებსა და მოზარდებში სპორტული დაზიანებების პრევენციის სამედიცინო და სოციალური ასპექტები

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სპორტული დაზიანებები ბავშვებსა და მოზარდებში, როგორც წესი, მოიცავს მსუბუქ სისხლჩაქცევებს და დაჭიმულობას. ამასთან, ნებისმიერმა სპორტმა შეიძლება გამოიწვიოს კუნთოვანი სისტემის დაზიანებები. მნიშვნელოვანია, რომ თავიდან იქნას აცილებული ასეთი დაზიანებები სათანადო წვრთნისა და ზედამხედველობის გზით, რათა უზრუნველყოს ახალგაზრდა სპორტსმენების უსაფრთხოება. ამიტომ, ამ პაციენტებისთვის სამედიცინო დახმარების გაწევისას ექიმებს უნდა ჰქონდეთ შესაბამისი კვალიფიკაცია და უნარები და გაითვალისწინონ თითოეულ სპორტში დაზიანებების სპეციფიკური ხასიათი და ადგილმდებარეობა. ახალგაზრდა სპორტსმენების

სასწავლო პროგრამებმა და შესრულების სტანდარტებმა უნდა გაითვალისწინონ მონაწილეების ბიოლოგიური ასაკი, ფიზიკური და ფსიქოლოგიური უმწიფრობა, ვიდრე მათი ქრონოლოგიური ასაკი, რათა თავიდან იქნას აცილებული ძვალ-სახსრის სერიოზული დაზიანებები ბავშვთა და ახალგაზრდულ სპორტში.

ეს მიმოხილვა ასახავს მოზარდებში სპორტული ტრავმების შემთხვევებს და განიხილავს, თუ როგორ მოქმედებს ბიოლოგიური და სოციალური ფაქტორები (მწვრთნელებთან, თანატოლებთან და მშობლებთან დაკავშირებული ფაქტორები), სხვადასხვა სპორტში ტრავმების შემთხვევებსა და ბუნებაზე. მწვრთნელებსა და მშობლებს, თუმცა, აქვთ შესაძლებლობა შეამცირონ ტრავმის რისკი შესაბამისი სპორტული აქტივობების შერჩევით, სწორი აღჭურვილობის გამოყენებით, წესების დაცვით, უსაფრთხო სათამაშო პირობების ხელშეწყობით და სათანადო ზედამხედველობის უზრუნველყოფით. ჯანდაცვის პროვაიდერები, რომლებიც ჩართულნი არიან ახალგაზრდა სპორტსმენების ტრავმების პრევენციასა და მკურნალობაში, უნდა ფლობდნენ უნარ-ჩვევებს, რათა დაადგინონ და შეაფასონ სპორტსმენის მომავალი ჯანმრთელობისა და შესრულების სიმძიმე და რისკი.

საკვანძო სიტყვები: ფიზიკური აქტივობის ტესტი, ბავშვობის დაზიანება, სპორტული დაზიანება, ახალგაზრდა სპორტსმენები, კითხვარის კვლევა.