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PROGRAMS FOR ADAPTING POST-INJURY TRAINING IN TRAMPOLINE GYMNASTICS

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Abstract: This article is dedicated to adaptation programs for trampoline gymnastics athletes' training after injury. The study examined athletes' physical, technical, and cognitive preparedness, as well as methods for optimizing the recovery process. These programs are designed to ensure safe and effective retraining, restore muscular and coordination functions, and maintain competitive performance levels. The article emphasizes the importance of an individual approach after sports injury, training intensity regulation, and a phased recovery system.

Keywords: trampoline gymnastics, injury, rehabilitation, rehabilitation program, adapted training, physical preparedness, sports recovery.

TRAMPOLIN GIMNASTIKASIDA JAROHATDAN SO‘NG QAYTA TAYYORLOV MASHG‘ULOTLARINI MOSLASHTIRISH DASTURLARI

Annotatsiya: Ushbu maqola trampolin gimnastikasi sportchilarini jarohatdan so‘ng qayta tayyorlash mashg‘ulotlarini moslashtirish dasturlariga bag‘ishlangan. Tadqiqot jarayonida jarohat olgan sportchilarning jismoniy, texnik va kognitiv tayyorgarlik darajasi, shuningdek, tiklanish jarayonini optimallashtirish usullari o‘rganilgan. Mazkur dasturlar sportchilarning xavfsiz va samarali qayta tayyorlanishini ta’minlash, mushak va koordinatsion funksiyalarni tiklash hamda musobaqaviy darajadagi ko‘rsatkichlarni saqlab qolish maqsadida ishlab chiqilgan. Maqola sport jarohatidan keyingi individual yondashuv, mashg‘ulotlarning intensivligi va bosqichma-bosqich tiklash tizimining ahamiyatini ta’kidlaydi.

Kalit so’zlar: trampolin gimnastikasi, jarohat, qayta tiklanish, reabilitatsiya dasturi, moslashtirilgan mashg‘ulotlar, jismoniy tayyorgarlik, sport tiklanishi.

ПРОГРАММЫ АДАПТАЦИИ ТРЕНИРОВОК ПОСЛЕ ТРАВМ В ПРЫЖКАХ НА БАТУТЕ

Аннотация: Данная статья посвящена программам адаптации тренировок для спортсменов по прыжкам на батуте после получения травмы. В ходе исследования изучались физическая, техническая и когнитивная подготовка спортсменов, а также методы оптимизации процесса восстановления. Эти программы разработаны для обеспечения безопасного и эффективного восстановления спортсменов, восстановления мышечной и координационной функций, а также сохранения соревновательных показателей. В статье подчеркивается важность индивидуального подхода после спортивной травмы, регулирования интенсивности тренировок и поэтапной системы восстановления.

Ключевые слова: батутная гимнастика, травма, восстановление, реабилитационная программа, адаптированные тренировки, физическая подготовка, спортивное восстановление.

INTRODUCTION

Trampoline gymnastics is a complex and dynamic sport that requires athletes to possess a high level of balance, strength, coordination, and rapid reflexes. In this sport, athletes perform various acrobatic movements, which significantly increase the risk of injury. Research indicates that injuries related to joints, muscles, bones, and the spine are common among trampoline gymnasts, and these injuries can have long-lasting negative effects on their sports performance. Moreover,

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an injury affects not only the athlete's physical condition but also their psychological state, as anxiety, decreased motivation, and reduced self-confidence can slow down the recovery process.
The post-injury period requires a systematic approach to adapting and retraining exercises. The recovery process involves not only restoring the injured muscles or joints but also gradually rebuilding the athlete's endurance, balance, and coordination abilities. In addition, it is essential to reduce the risk of re-injury and safely improve the athlete's physical condition. Individualized and adapted training programs facilitate this process, ensuring a faster return to the previous sports level and minimizing the risk of further injury.
Contemporary scientific literature studies the post-injury recovery process across various sports; however, there is insufficient research specifically on rehabilitation programs tailored to trampoline gymnastics and their effectiveness. Therefore, developing and adapting systematic post-injury retraining programs in trampoline gymnastics is a practically and theoretically relevant issue.
The primary aim of this study is to develop adapted retraining programs for trampoline athletes after injury, determine the mechanisms for their phased implementation, and analyze the effectiveness of these programs. The results of this research are intended to optimize the recovery process, reduce the risk of re-injury, and enhance the athletes' performance in their sports activities.

LITERATURE REVIEW

Injuries among trampoline gymnasts have been highlighted in numerous studies. For instance, Jones et al. (2018) reported that injuries related to joints and the spine are the most common among trampoline athletes and significantly reduce the duration and continuity of their sports performance. Similarly, research by Smith (2020) found that the effectiveness of post-injury training programs depends on the athlete's age, experience, and type of injury.
The development of rehabilitation programs has been widely studied in the fields of sports medicine and physical education. The reviewed literature indicates that gradually increasing training intensity based on an individualized program accelerates the athlete's recovery and reduces the risk of re-injury (Miller, 2019; Zhang, 2021). Post-injury programs typically include the following stages: restoring initially reduced physical activity, enhancing muscle and joint endurance, retraining balance and coordination, and finally returning the athlete to their previous level of sports performance.
Research specifically on trampoline gymnastics is relatively limited compared to other sports. While many studies focus on general gymnastics or acrobatic sports, the unique characteristics of trampoline gymnastics – height, speed, and rapid coordination requirements – necessitate the development of individualized rehabilitation programs. In addition, the importance of psychological recovery has been emphasized: if an athlete cannot regain confidence and motivation after an injury, the effectiveness of training decreases (Peterson, 2017).
This literature review demonstrates that the post-injury recovery of trampoline gymnasts requires a comprehensive approach. Physical exercises, individualized programs, safety measures, and psychological support, when implemented together, not only accelerate the recovery process but also reduce the risk of re-injury. Therefore, developing adapted and phased rehabilitation programs based on scientific evidence is both practically and theoretically relevant.

RESEARCH METHODOLOGY

This study aimed to adapt post-injury retraining exercises for trampoline gymnastics athletes and analyze their effectiveness. The research involved trampoline athletes aged 14-18, including those in the post-injury recovery process and a control group of healthy athletes. Participants were selected based on the type and severity of their injury as well as their overall physical condition.

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Data collection methods included experimental observation, standard tests and measurements, as well as questionnaires and interviews. Muscle strength, endurance, balance, and coordination were assessed, while post-injury pain levels were evaluated using the Visual Analog Scale (VAS). Psychological state, motivation, and attitudes toward training were explored through interviews.

The post-injury training program was individually tailored and divided into three stages: initial (recovery), intermediate (balance and coordination), and advanced (return to previous sports level). At each stage, the intensity and complexity of exercises were adjusted according to the athlete's recovery progress.

The table below presents the main stages of the study and the corresponding training program:

Stage	Objective	Type of Exercises	Exercise Intensity	Assessment Methods
Initial (Recovery)	Restore physical activity	Low-intensity physical exercises, stretching	Low	Muscle strength test, VAS
Intermediate (Balance & Coordination)	Improve balance and coordination	Specific balance and coordination exercises	Medium	Balance test, coordination test
Advanced (Return to Previous Level)	Return to previous sports performance	Technical movements, high-intensity exercises	High	Sports performance evaluation, psychological questionnaire

The research results were analyzed using statistical methods: mean values, standard deviations, t-tests, and correlation analyses were employed to compare the experimental and control groups. Additionally, medical examinations were conducted to ensure the safety of each training session and to minimize the risk of re-injury. This methodology enables post-injury retraining programs for trampoline athletes to be systematically and effectively adapted, optimizing both the athletes' recovery rate and overall sports performance.

RESULTS AND DISCUSSION

The research results were analyzed using statistical methods: mean values, standard deviation, t-tests, and correlation analyses were applied to compare the experimental and control groups. In addition, medical examinations were conducted to ensure the safety of each training session and to minimize the risk of re-injury. This methodology allows post-injury retraining programs for trampoline athletes to be systematically and effectively adapted, optimizing both the athletes' recovery rate and overall sports performance.

The adapted post-injury training program had a significant positive effect on the recovery process of trampoline gymnasts. Athletes in the experimental group showed marked improvements in muscle strength, balance, and coordination compared to the control group. Low-intensity exercises in the initial stage helped restore muscle and joint endurance and reduced pain levels. In the intermediate stage, balance and coordination exercises enhanced the athletes' ability to perform technical movements accurately and efficiently, preparing them for high-intensity exercises. In the advanced stage, the rate of return to their previous sports level increased, and their psychological state and motivation for training significantly improved.

Analysis of the results indicates that individually tailored training programs reduce the risk of re-injury. Moreover, measurements and test results from the experimental group showed

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statistically significant differences ($p < 0.05$), confirming the effectiveness of the program and its practical relevance for trampoline gymnasts.

When compared with the literature, these findings are consistent with the studies by Miller (2019) and Zhang (2021), which emphasized the effectiveness of phased recovery and individualized programs for athletes. Additionally, this study is significant as the first to develop a specifically adapted program for trampoline gymnasts, considering the sport's unique characteristics – height, speed, and the complexity of acrobatic movements – which require post-injury training to be planned differently from other sports.

The discussion highlights that the rate of recovery depends not only on physical condition but also on psychological motivation. The study demonstrated that gradually increasing the training intensity within an individualized program enhances athletes' confidence and reduces the likelihood of re-injury. Furthermore, the program is flexible and can be adapted to each athlete's type and severity of injury and their recovery pace.

The results indicate that systematically and individually organized post-injury retraining is effective for trampoline athletes, helping them return to sport faster, reducing the risk of re-injury, and improving performance. Therefore, the findings can serve as a practical guide for athletes, coaches, and sports medicine specialists.

CONCLUSION

This study focused on developing adapted post-injury retraining programs for trampoline gymnasts and evaluating their effectiveness. The results indicate that individually designed and phased training programs significantly accelerate the athletes' recovery process, improve muscle strength, balance, and coordination, and reduce the risk of re-injury.

The adapted training program consists of three stages, each tailored to the athlete's physical condition and recovery pace. The initial stage aims to restore muscle and joint endurance, the intermediate stage focuses on developing balance and coordination, and the advanced stage is dedicated to returning the athlete to their previous technical and sports performance level. The study demonstrates that this approach supports not only physical but also psychological recovery, enhancing the athlete's motivation and confidence.

Compared to the existing literature, this research is significant as it practically confirms the effectiveness of a program specifically adapted for trampoline gymnastics. The findings can serve as an important guide for athletes, coaches, and sports medicine specialists, as they enable a systematic and safe organization of the post-injury recovery process.

Furthermore, the results provide a foundation for future research, such as developing even more individualized programs based on the type of injury, the athlete's age or experience, conducting detailed monitoring of psychological and physiological parameters during recovery, and comparing the effectiveness of various training technologies.

Overall, this study confirms the scientific and practical significance of systematically, safely, and effectively adapting post-injury retraining programs for trampoline athletes, supporting faster and higher-quality recovery, as well as improving their sports performance.

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