

HEALTH & INJURY PREVENTION FOR YOUNG ATHLETES
MANUAL

Publisher: Athletic sports club "ASK" Split, Croatia
Design and print: Abel Internacional d.o.o., Split, Croatia
Copies: 600
Editors: Frane Žuvela
Ana Kezić



EUROPEAN PARTNERSHIP ON SPORTS

The content of this publication does not reflect the official opinion of the European Union. Responsibility for the information and views expressed in therein lies entirely with the author(s). Reproduction is authorised provided the source is acknowledged. „This audiovisual material has been produced with financial assistance of the European Union. The content of this audiovisual material is the sole responsibility of ASK Split and can under no circumstances be regarded as reflecting the position of the European Union.”

Sadržaj ovog audiovizualnog djela ne odražava službeno stajalište Europske unije. Odgovornost za informacije i stajališta iznesena u njemu leži isključivo na autorima. Umnožavanje je dopušteno pod uvjetom da se navede izvor. „Ovaj audiovizualni materijal proizveden je uz financijsku pomoć Europske unije. Odgovornost nad sadržajem ovog audiovizualnog materijala ima isključivo ASK Split i ne može se ni pod kojim okolnostima smatrati da odražava stav Europske unije.”

In cooperation with:

- AK "OLYMP BRNO", BRNO, CZECH REPUBLIC
- ŠPORTNO ZDRUŽENJE-UNIONE SPORTIVA DILETTANTISTICA "BOR", TRIESTE, ITALY
- ALBA REGIA ATLETIKA KLUB ARAK, SZEKESFEHERVAR, HUNGARY
- OTVORENA MEDIJSKA GRUPACIJA O.M.G.
- AK "AC MALACKY", SLOVAKIA
- AK "KOPER", SLOVENIA
- PRIVATNA ORDINACIJA DR.MIRJANE BEZDROV

CIP - Katalogizacija u publikaciji
SVEUČILIŠNA KNJIŽNICA
U SPLITU

UDK 796.071:616-001(035)

ŽUVELA, Frane

HIP Ya! : health & injury prevention
for young athletes : manual / Frane
Žuvela, Ana Kezić. - Split : Athletic
sports club "ASK", 2015.

Bibliografija.

ISBN 978-953-58658-0-3

1. Kezić, Ana

I. Športaši -- Ozljede -- Prevencija II.

Športske ozljede -- Prevencija -- Priručnik

151226077

HIP YA!

HEALTH & INJURY PREVENTION FOR YOUNG ATHLETES

MANUAL



Split, 2015

1. INTRODUCTION

The general objective of the action HIP Ya! was to prevent injuries and protect health of young athletes at the grass root level through involvement of coaches with extensive experience in training youth. The coaches are the first and the most important figures in sports careers development of all athletes. Their influence is the foremost in formation of habits and technique of youth in training. They are in position to prevent injuries during the whole career of an athlete by forming beneficial habits and encouraging the young person to adhere to proper discipline that will safeguard his/hers health and prevent injuries.

Injury prevention and health protection of the young athletes is of outmost importance for their sports lives and the afterlives. According to the nowadays knowledge, the techniques, good habits during the training process and at the competitions and well developed training cycle, as well as appropriate selection procedure are decisive factors for prevention of injuries and protection of athletes' health. For fulfilling all those tasks, the coaches are the central persons and they are the ones who can make a real difference in injuries prevention and health protection.

All the coaches involved in the action were practitioners that are dealing with injuries and health risks of their trainees in their professional lives. The most of them had extensive experience in training process that is designed to secure acquisition of proper techniques, optimize the sport results, but also to prevent injuries and protect athletes health. Some of them had significant expertise in planning dynamic of the training cycles in order to avoid overtraining and achieve maximum results. Their knowledge and the tricks and tips of profession can be widespread.

The general objective of the HIP Ya! action, as well as the specific one were in accordance with the main objective of the Preparatory Action European Partnership on Sports for 2013. The action established completely new and informal network of athletic clubs with youth programmes in six EU members. The action was almost grass root and it diverseed from the others, as it was organized from the bottom, without involvement of formal associations on national or European level. The action network started informally through co-operation of likely minded coaches and athletic clubs and expanded by the word of mouth. The athletic clubs network and theirs coaches were well placed to improve the training condition from within and to safeguard health and prevent injuries. The action mainly consisted of exchange of information and good practices and common training

initiatives. It resulted in production of this training manual and video for coaches in athletics and other sports as the athletics is one of the basic sports and its methodology can be applied in other sports.

The action HIP Ya! had 8 partners from 6 different countries. None of the partners were token partners, all of them had significant proportion of the budget, as well as significant portion of the activities that had to be carried out. The applicant (ASK Split) was in charge of the action management. The activity included three partner meetings that were held in Koper (kick off meeting in the January 2014), Malacky (autumn 2014), and Székesfehérvár (May, 2015). The meetings were attended by the members of Steering committee (each partner sent one representative and ASK two). At the meetings, the strategic decision making, action monitoring and supervision took place. The meetings lasted for day and a half.

The applicant and the partners strongly believe that proper training practices exchange can happen only when actually practising training. So, the exchange was planned as a series of three fourteen days long camps for young athletes and their coaches from the partner organizations. The activity lasted for 15 months (from January 2014 to March 2015). The first camp was held in Split, the second in Brno, and the last one again in Split. All coaches involved in the action were at all camps (one or two coaches from each partner, depending on partner's capacities and decision). Beside coaches, eight or nine young athletes from the clubs also participated in the camps. The young athletes were the same or different, depending on the individual partners' decisions in accordance with their needs and the needs of the action. During the camps, the coaches demonstrated their methodologies, discussed, adjusted and, at the end, adopted them. The camps covered different areas of athletic training - throwing disciplines, short distance running and jumps (high jump, pole vault jumps and long distance jumps) and general training.

The main goal of this Manual is to be practical, clearly written and to contain information needed the most by the coaches. The Manual was designed around the question: "What would have helped you in prevention of injuries and protection of health of your trainees? What did you want to know, but there was nobody you could ask?"

Shooting of specific exercises and techniques important for injury prevention and health protection were also done and are presented in the DVD. The video was followed with ongoing commentary of different coaches who explain in detail the background of exercises and techniques in their mother tongues. The video has subtitles in English.

2. APPLICANT AND PROJECT PARTNERS PROFILES

“ASK” SPLIT



“ASK” Split was founded in 1948 and is one of the leaders in the development of athletic sports in Croatia and one of the best Split sports clubs at all. The club has a rich tradition. It develops athletics from the youngest to the best. So, athletic school regularly attends 300-400 participants. Older athletes regularly appear in all national competitions. In the athletic performances of the Croatian national team every year 15-20 ASK competitors are engaged. Our athletes won World and European medals. Our main sportsperson is clearly Blanka Vlasic. According to mentioned data, ASK is the most successful sports club in the city of Split.



In the structure of the development of sports programs ASK has developed models for:

- Top sport
- Competitive sport
- Athletic school and youth development

Today, ASK's athletic school is the largest and of highest quality schools in Croatia. ASK's main goal is development of programs for young athletes and to support youngest juniors to build their talent by participating in the Croatian athletic championships, and performing at World and European competitions in their age categories.

Athletes that were a part of the project:

Ivana Vuletić, 1997.

Shot put (3kg) 14,75 m

Disc 43 m

Balkanijada, shot put 14 m - 3 place

Competitor at young junior european championships in Baku

Petra Jakeljić, 1995.

World junior championships Eugene – hammer throw, 56,90 m

Croatian Junior championships - hammer throw, 58,89 m, 1. place

Mirta Kulišić, 2000.

Croatian championships, 1. place – javelin

Croatian national team, 2. place - javelin

Bartul Zemunik

National record javelin (600 g) - 66,27 m

Indoor national record shotput (4kg) – 19,90 m

Croatian national team – 1. place javelin, 1. place shotput

Croatian cadet championships – 1. place shotput, disc , javelin

AK "AC MALACKY", SLOVAKIA



AC Malacky was established at 1993. The members of a club were mainly successful youth and junior athletes. The best athletes in the history of this club were sprinters and jumpers. Some people got interesting results at the European and World scene. Alena Patkánová was sprinter at 2001 world youth championships in Hungary, Alexandra Štuková was third at 400 m at world youth championships in Ostrava, 2007. The prime generation of athletes is represented by Monika Baňovičová (The World Youth Championships 2011, the European Junior Championships 2013 and The World Junior Championships 2014) and Eliška Chvílová (European Youth Olympic Festival 2011). The makers of these successes are the coaches Vladimír Handl and Petr Filip.

The Athletic Club AC Malacky is located at Grammar Scholl at Záhorácka Street Malacky 95. The athletes train at 250 metres long running circle with synthetic surface and the long jump sector has the same surface too. It's situated next to the running stadium. The athletes can train in two halls and a gym.

We are used to conditions near our town for athletics preparation in autumn and spring and we have the choice to visit the spa and other wellness procedures. Momentally the best athletes of the club prepare for pushing the limits for The World Youth Championships (U17) in Cali, Colombia, European Youth Olympics Festival in Tbilisi, Georgia and The European U23 Championships in Tallin, Estonia.

Michal Mecháček - the member of Slovak Youth Athletics Team, was silver medalist at 100 and 200 m at the Slovak Youth Championships in Dubnica nad Váhom (June 2014); double winner with relay of AC Malacky at 4x100 and 100 -200 -300 -400; Silver medalist at 200 m; and bronze medalist at Indoor Slovak Youth Championships in Bratislava at 60 m and the member of gold relay at 4x200 m (2015).

Boris Pribil - the member of Slovak Youth Athletics Team, was gold medalist at 400 m at the Slovak Youth Championships in Dubnica nad Váhom (June 2014) and double winner with relay of AC Malacky at 4x100 and 100 -200 -300 -400. Also, he was Slovak 400 m champion at Indoor Slovak Youth Championships in Bratislava and the member of gold relay at 4x200 m (2015).

Susanna Chlepková - Fifth at finale 60 m at The Slovak Indoor Youth Championships in Bratislava 2015, second at Slovak Grammar School's Championships at 100 m (Trnava 2015).

Marek Havlík - Fourth at the finale of schools competition Looking For The New Olympionics at 1000 m (Dubnica nad Váhom, 2014); the champion at Indoor Slovak Pupils Championships in Bratislava 2015 at 800 m; and the member of gold youth and pupil's relay at 4x200 m in Bratislava (2015).

Silvia Morávková - the finalist of the finale of schools competition Looking For The News Olympionics (Dubnica nad Váhom 2015), the member of pupils and youth finale at the indoor Slovak championships at 800 m.

Samuel Kollár - Third of Slovak Youth Championships in Dubnica nad Váhom (June 2014) at 400 m and double winner with relay of AC Malacky at 4x100 and 100 -200 -300 -400.

Marcel Žilavý - Slovak indoor champion at pupils category at 60 m hurdles (new National Indoor Pupils Record) and 150 m (new National Indoor Pupils Record); The gold medalist with relay of AC Malacky at youth pupils and youth category (Bratislava Indoor 2015); second at the International Kids Athletics Games in Konya (Turkey 2015) at 100 m hurdles (13,55 - the best season time at pupils category 2015); the member of Slovak Pupils Athletics Team and candidate for Slovak Youth Athletics Team.

Monika Baňovičová - The former member of Slovak Junior Athletics Team; the member of The World Junior Athletics Championships in Eugene, Oregon (United States 2015) at triple jump; second at triple jump at International Meeting of Slovenia, Croatia, Hungary, Czech republic and Slovakia at Maribor (SLO 2014); Slovak junior champion at 100 m hurdles and triple jump (Košice 2014); Third at The Slovak Indoor Championships at 60 m hurdles women (Bratislava 2015).

Eliška Chvílová - The fifth at the Slovak Indoor Championships at long jump women (Bratislava 2015) and candidate for the Slovak U23 Athletics Team for Tallin, Estonia 2015.

Kristína Martinusová - The silver medalist at The Slovak Youth Indoor Championships at triple jump (Bratislava 2015) and candidate for Slovak Youth Athletics Team.

Karolína Smreková - The silver medalist at the Slovak Grammar School's Championships (Trnava 2015) at discus throw and Candidate for Slovak Youth Athletics Team.



ALBA REGIA ATLETIKA KLUB ARAK, SZEKESFEHERVAR, HUNGARY



The Alba Regia Atlétikai Klub operates in Székesfehérvár exists since 1924. It had two olimpians in 1996 and 2000 in middle distance running. Nowadays is one of the most successful clubs for youth between 13-19 years old. In 2014 the club started the ARAK Aftergrowth Academy, the only in Hungary. The club has 12 coaches in all athletic disciplines. 250-300 young athletes train every day in a completely new Regional Athletic Center in Székesfehérvár. ARAK has 10-12 athletes in national team in all categories every year.

In 1924 Székesfehérvár founded the city's first athletic club - Alba Regia Athletic Club. Since then, it has been providing opportunities for exercise and recreation for those who were interested.

The second half of the nineties was the most successful period in terms of results. The Hungarian middle-distance running athletes had outstanding results and were a part of two Olympic Games. Besides long and middle distance, sprint racers enhanced further in numerous international competitions. Balazs Molnar proved to be insurmountable in 400 m discipline.

Our athletes had excellent results in long jump, triple jump and heptathlon as well. Rita Babos was successful in all types of jumps: long jump, high jump and triple jump; won the Hungarian league titles, and even proved to be invincible! Zoltán Vaskó is our successful high jumper with several titles.



In addition to the listed domestic successes of athletes in Székesfehérvár, Hungary was represented in many countries of the Olympics, and World and European Championships, European Cups and World Games. There are dozens of indoor and outdoor champion's names that were not mentioned in this text.

Athletes that were a part of the project:

Mónika Zsiga: Hungarian Champion 2014, 400 m hurdles 60.76

Dániel Szabó: European Youth Olympic Trial - Baku 2014, 100 m 10.87 - 5. place

Hungarian youth team members:

Milan Pisch - 100m

Gergő Szépe - Long jump

Márton Deák - 300 m hurdles

Boglárka Budai - 400/800m

Sára Mátó - heptathlon/300 m hurdles

AK "KOPER", SLOVENIA



Athletic Club Koper (AKK) was established in 1962. In 1971, it had the first visible successes at the republican level in the youth category. In 1979, our training opportunities improved slightly. Athletic track was still in such condition that quality training was almost impossible. In 1995 athletic track was covered with Polytan artificial turf, which allowed the implementation



of competitions at a higher level. The opening of the stadium was in May, 1995. In 2011 a new modern athletic complex was built, which is used today. In all these years the coaches of AKK worked mostly on the pervasiveness and younger categories. It should be noted that AKK is an amateur club, which has neither a professional coach but only enthusiasts.

On behalf of the club, and especially on behalf of the athletes we can say that the participation in the project was an excellent opportunity to learn about the latest trends and approaches in training.

Equally important was the meeting of athletes from other countries with whom they exchanged experiences and gained many new skills. It is very important for young people to have an opportunity to learn about two great stars of world athletics Blanka Vlasic and Sharko Ksasparkovo, which are models for many athletes. To train with them was the only desire which was not expected to be realized. Their guidance in training for them was valuable.

AK "OLYMP BRNO", BRNO, CZECH REPUBLIC



ACP Olymp Brno, a police sports club, was founded in 1992 and at the first had a three-member committee, where chairman was Zdeněk Nekoxsa, coach Josef Sečkář and economist Miss Plevová.

The club began working with the daughters of the chairman and they agreed that they will deal only individuals. Erika Suchovská joined ACP Olymp Brno as well as Šplíchalová, Mrnková and Duraj, excellent hurdler and medalist. These were the initial beginnings of the birth of ACP Olymp Brno. An excellent result of Erika Suchovská at the indoor European Championships in 1996 in Stockholm, where she finished second in the 200 m, was an excellent start.

Police forces also train at ACP Olymp Brno and until today they count approximately 20% of the membership base. A women's team in the Extra league championship was always placed among the top three teams in the country. Also in the Junior European Cup girls were second behind Moscow for 4 consecutive times.

- our club - 2014 - 1 place - champion in the team competition U19 - GIRLS
- our club has 16 girls in national team - U 15, U 17, U 19, U 22 and in the senior category

Our best :

Jana Novotna

Born : 26.1.1999

Personal best:

- heptathlon 5087 pts
- 100m h 14.23 s
- hj 1.73 m
- sp 11.53 m
- 150m/200m 18.65 s/25.45 s
- lj 5.92 m
- jt 36.67 m
- 800 m 2:29.25

Results/achievements:

- student czech champion 2014 - heptathlon, hj (15 years)
- czech record holder – pentathlon (3853 pts)
- winner of hj on international match u16 (maribor-slovenia 2014)
- czech talent of the 2014 year (category up to 15 years)
- indoor czech champion 2015 – pentathlon (16 years)
- eyof 2015 tbilisi – she has entry limit for the participation (lj-5.92m)

Šilhanová Rebeka - born : 22.3.1995 -pole vault

- 6. place - jwch - eugene 2014
- czech junior record holder - 435 cm
- 4 x czech champion

Pírková Marcela - born : 25.1.1996

- 2 place - czech indoor junior championship 2015 - 200 m
- 3 place - czech indoor championship 2015 - 200 m

Svobodová Lenka - born : 12.10.1995

sf - 2014 - eugene - jwch - 400m hurdles



ŠPORTNO ZDRUŽENJE - UNIONE SPORTIVA DILETTANTISTICA "BOR", TRIESTE, ITALY



Bor Athletic Club is part of the Sports Club Bor (Športno združenje Bor), a lively and popular sports centre primarily serving the Slovene community in Trieste, Italy. Bor is the Slovene name for the pine tree, a tree widely present in the Karst area overlooking Trieste. The tree stands for perseverance - a characteristic every sportsperson should have. Since 1959, the club has offered volleyball, basketball, table tennis, swimming and rhythmic gymnastics. At the sports centre, there is also a sports school for preschool and primary school children, who learn different sports skills in a playful way. Almost 100 children, from toddlers up to primary school children, attend classes at the sports centre every Saturday.

The Athletic section was established by Vojko Cesar (who coached both himself and the first Bor athletes) and the administrator Bruno Križman in 1962. Since then it has achieved numerous significant results in local, regional and national junior competitions. Irena Tavčar, Gorazd Pučnik and Claudia Coslovich are some of the most prominent Bor athletes who achieved remarkable national and international results. In 1977 on the national junior competition in Florence Irena Tavčar achieved the first national title in discus throwing. She was selected into the national junior team several times. Gorazd Pučnik was first in the pentathlon in the junior league in Mantova in the year 1980. In 1983 he won in the decathlon competition, qualifying for the European junior championship which he didn't take part in due to injury. Claudia Coslovich has begun her successful athletic career at the Bor Athletic Club, becoming a 20-time national champion in javelin throw (65.30 m personal record) from 1993 to 2007 and she also participated in two Olympic Games: Sydney 2000 and Athens 2004.

After a 20 year time break, in 2010, the Bor Athletic Club was reestablished and it has been growing in importance and prestige. More than 50 young athletes, from age eight to fifteen, have been enrolled and some of them have already distinguished themselves on a national level.



PRIVATNA ORDINACIJA DR.MIRJANE BEZDROV



General practitioner Dr. Mirjana Bezdrov has had a practice for 15 years now and counts more than 1,800 patients. Along with her nurse, Gordana Kljaković, they make a great team that has two goals: the main goal is to accurately diagnose the disease and to offer their patients the most effective treatment methods currently available, the second goal is the proactive protection of the patient's health by means of professional counseling reinforced by years of experience and constant improvement. Dr. Bezdrov has participated in a number of congresses of family medicine and the professional part of the congress of diabetics. She has been awarded for her active participation by the association of diabetics. She is also an associate in several clinical and epidemiological studies.

Most of her patients are young people who are engaged in sports and lead a modern lifestyle so she's quite familiar with the role and importance of medicine in the life of a young athlete.

OTVORENA MEDIJSKA GRUPACIJA O.M.G.



"Open Media Group" - O.M.G. is an organization established to promote and improve quality of civil society and protection of human rights, especially of young people, merging modern technology and arts, especially film art; raising the awareness of young people and promoting the values of a society of equal opportunities for all citizens.

The association brings together young people who desire to use their expertise and experience in order to promote human rights and democratic values. Our experience includes production, organization, design of media campaigns, as well as the legality and impact of the media. O.M.G. has creatively designed and implemented numerous media awareness campaigns, documentaries, fiction and animated films with a variety of partners.

3. CAMPS

3.1. Training camp 1 - SPLIT - 11. - 20. 04. 2014.

It included the establishment of an expert project team involving 1-2 coaches from each team. At the meetings of the expert team training schedule and activities at the camp were arranged.

- Medical testing - General practitioner dr.med. Mirjana Bezdrov
- Lecture on "The Stages in exercises and loads in order to prevent injuries in young athletes-jumpers". Lecturer Michail Pogany. Place: hotel "Zagreb", Duilovo.
- Lecture on "Injuries of overtraining in young athletes." Lecturer dr. Aleksandar Vujičić. Place: hotel "Zagreb", Duilovo.
- Lecture on "General and specific factors in the prevention of injuries in young athletes." Lecturer prof. Joško Vlašić. Place: lecture hall "Joker".
- Lecture on "Doping in sport". Lecturer dr. Aleksandar Vujičić. Place: hotel "Zagreb", Duilovo.

In order to share coaches' experiences, the camp was based mostly on trainings.



The Stages in exercises and loads in order to prevent injuries in young athletes-jumpers

Michal Pogany

On April 11-15, I attended an athletic camp organized by ASK Split. It was attended by 6 external Athletic Clubs within this project.

I have to say that I was enthusiastic from the atmosphere on the sports field, but also outside of them, since we all gathered in such a large number for the first time. It is logical that not everybody is perfect, we must still learn, so we looked at how others train. We tried to help, advice one another and fix mistakes right there on the field. The most important and most relevant everyday's meetings were those where all coaches discussed the most basic things, as regard to the correct implementation of the exercises for proper selection of training loads to avoid unnecessary injuries. It was mainly about correcting arms and upper body positions within basic running workouts and during strength exercises as well as whole body strengthening. I believe that there were beneficial discussions for all participants.

'Gradualism in exercises and loads in the jumps in order to prevent injuries in young athletes'

The lecture had two parts: theoretical and practical.

Both in top and middle level performance jumpers workout is putting a huge load on entire musculoskeletal system. Not only athletes, but unfortunately sometimes even the coaches pay little attention to health prevention. Therefore, we must give proper attention to this problem from early age on:

- We must respect the physiological age of jumpers
- Training should be versatile, focused on multiple events, aimed not only at developing power of leg's muscles, but to whole body areas, to reduce the risk of muscle disbalance approximately till age 15.
- During specialization of long stage preparation /16-19/, we strive to provide systematic and gradually increasing load and effort.

- Based on age and gender we only take part in appropriate number of races.

- We need to ensure the selection of suitable surfaces for run-ups, take-offs and pits.

- Make sure to select appropriate shoes.

- We must devote enough time to good regeneration.

HORIZONTAL JUMPS require, in particular the development of speed, plyometric and power capabilities. Hence the emphasis is given to maximize the selection of training where it has to be various for young athletes after age 16.

We must take care that the approach is accelerated, that it needs to be connected with take-off, as to achieve a maximum take-off speed at the optimum angle. Also we must take care about good balance during jump and getting into the right position during landing.

The lack of fitness and technical preparation of long and triple jumpers is obvious in:

- Deceleration in the end of the approach
- Too much step shortening before take-off
- Step lengthening before take-off
- Running across the heel
- Over leaning forward or backward during take-off
- Flat take-off
- Big bent knee joint during take-off
- Under active swinging leg
- Unfinished take-off
- Not holding the torso in the upright position

Protection from injury of young jumpers can be raised with special training exercises - imitation exercises. These exercises should only be carried out under coach control and drilled until AUTOMATIC LEVEL formats.

In the second part of this lecture on an athletic stadium we saw demonstrations from a rich selection of training exercises such as running, bouncing and strengthening. I pointed out how to correctly perform basic sprinting exercises where the focus is on holding the head, trunk

HIP YA!

HEALTH & INJURY PREVENTION FOR YOUNG ATHLETES

and arms. We have demonstrated large amount of bouncing and imitation exercises, as well as basic, but also special strengthening exercises with weights.

Finally, I would like to say that education, commitment and in-superiority of the coach plays a key role in shaping young athletes, as manifested in adulthood.



“Over-use” trauma in young athletes

Dr. Aleksandar Vujičić, Orthopedics and Traumatology

Athletics is a specific sport that contains a variety of sports disciplines as running (sprint, middle, long distance, hurdles long and short running), jumping (horizontal jumps - long jump and triple jump and vertical jump – high jump and pole vault) and throw (shot put, discus, hammer throw and javelin). And all that is present in the men's and women's competition.

Such a wide range of load on virtually all the human body systems, especially bone segments, causes overload syndrome of the busiest bone-muscle-joint assemblies and to a wide extent in the diversity and specifics of the disciplines in which the athletes compete. DEFINITION: Condition when a repetitive submaximal load of the muscular system exceeds the capacity of vacation to compensate the structural adaptation of the organism that causes this load.

FREQUENCY (National Council of Youth Sports USA 2013): 45% - 54%. The highest frequency is observed in running (68%), less in skiing and handball (37%). In other researches frequency ranges 45-55%. These results are relevant because the mentioned study from 2013. states that in the United States about 60 million children in the age group 6-18 years is involved in training, of which 44 million more than one sport, and 27 million children are in team sports.

REASONS: In recent years, the reasons for this are the following: achieving high-quality results of young athletes in the early junior age; the trend of organizing the world championships in the junior and younger junior (youth) ages; important regional-level competition in the pioneering stage. This trend of creating an even younger athletes with good results forces most coaches in reaching out for very serious, intensive training from an early age, even in pioneer and younger junior ages. This generates the urgency of young organism to adapt to the specifics of disciplines while in condition of rapid growth and the formation of the body.

This paper demonstrates the scope and diversity of over-use injuries in orthopedic surgery for more than a decade of treating young athletes

as a doctor of Yugoslavia and Montenegro athletic team of. Acute traumas with direct mechanism were not taken into account.

Causes

INTENSIVE REPETITION TRAINING, often twice a day, early in the junior stage which leads to rapid and quality results

EARLY SPECIALIZATION, orientation for differential athletics discipline (triple jump, throws, high jump), which enables early achievement of valuable results in these disciplines

EARLY INTENSIVE ASYMMETRIC LOADS - arising from the previous cause, because intensive training with early specialization intensively burden highly asymmetric some musculoskeletal joint assemblies and all that in the period of rapid growth which creates conditions for their vulnerability.

PRESENCE OF BIRTH DISFIGUREMENTS (increasingly common deformity like flat feet, spine curves, hip dysplasia and knee valgus)

POOR AND UNDEVELOPED TECHNIQUE (trainers "do not have time" to build good technique in the desire to achieve the result as soon as possible)

PRESENCE OF EPIPHYSEAL GROWTH ZONES that are still open in the vicinity of large joints. It should be noted that in the period of rapid growth around 80% of the vertical growth is from the knee regions which are most vulnerable. In that period the growth in height reaches up to 10 cm per year and more, which causes permanent

TENSION (increased muscle tone) of all soft tissues (muscle-tendons and neurovascular) that are "stretched" following the rapid bone growth. Their tension which is increased by strengthening the very muscles creates a high risk of injury.

Presence of epiphyseal growth zones near the skeletally immature joints during intense repetitive, often asymmetrical loads often deform the epiphyseal growth zones and create conditions for ATYPICALLY EPIPHYSES FORMING around the joints and later deformations of the joints and their environment.

PRESENCE OF ACID METABOLITES, INTENSIVE MUSCLE WORK IN THE BLOOD AND MUSCLES. It is known that young athletes do not have a significant anaerobic capacity, due to lower and still unformed anaerobic enzyme activity, so that anaerobic training needs to be avoided in this period.

Yet, in desire to achieve faster results and thanks to the good adaptability of the young organism, these practices are carried out, which causes high blood lactate levels and acid metabolites as products of intensive muscle work. Undeveloped enzyme structure of compensation of acid products as a result of intensive muscle work which are released and not metabolized in a timely manner during and immediately after large training loads in the muscles and muscle-tendons zones causes their increased vulnerability.

THE PRESENCE OF HIGH LEVELS OF GROWTH HORMONE which causes high “endogenous anabolism” in this period of life and the submission of significant loads with surprising ease, as well as rapid progress in the results.

Classification

1. Bone injuries
 - a. Diaphyseal - stress fractures
 - b. Epiphyseal - avulsions
 - c. Epiphysiolysis
2. Bone-tendons injuries
 - a. Avascular necrosis
3. Muscle-tendons and entezopathy (soft tissue)

1. BONE INJURIES

a. STRESS FRACTURES

Represent bone injuries in the presence of certain risk factors: the diaphysis of tubular or cancellous bone in recurring, long-term training loads, especially in long running, hurdle running or jumping. The intensity of pain is not great, the diagnosis is often clinical, and radiological only several weeks after that.

Types and the frequency in my documentation:

Fibula - 11 cases

Distal tibia - 4 cases

Metatarsal bone diaphysis I - V (usually III and IV) - 23 cases

Sesamoid bone of the thumb - feet - 5 cases

Patella - 3 cases (one of which is vertical)

Pubic bone – 1

Thigh bone (femur) - 1 (distal diaphysis-metaphysis)

b. EPIPHYSEAL - AVULSIONS

Injuries caused by repetitive, highly asymmetric explosive training loads especially in throws and jumps and hurdle running. Repetitive contractions of all strong major muscle groups that tend to become stronger than the immature bone cause the separation of insertion of muscles with a smaller or larger part of the bone. It is characterized with long-lasting pain with middle intensity with acute exacerbation after avulsion. The pain near the joint mimics the muscle damage because it prevents the contraction of avulsed muscle.

Types and the frequency in my documentation:

SIAS (spina iliaca ant sup) - 5 cases

Tuberositas ishi - 2 cases

Tuber calcanei - 3

Trochanter of the femur - (2 maius and 3 minus)

Navicular (scaphoid feet bone) - 3 (two medial central, one dorsum)

Basis V of MT bone - 17 cases

Head of the fibula - 5 cases

Stiloid of ulna - 2 cases

Proc transversum L3 - 1 case

c. EPIPHYSIOLYSIS AND SPONDYLOLISTHESIS

It alludes the changes in epiphysis-metaphysis relations in growth zone under the influence of repetitive training loads. However, we can not just blame it on the training loads but it can also appear due to existing constitutional, endocrine or genetic cause with intense training load as a precipitating factor. It is characterized by long-lasting pain of low or moderate intensity, depending on the training load without any special decrease of functions, except in severe cases.

Spondylolisthesis I5/I and I4/I5 - 3 cases

Epiphysiolysis of the femur - 2 cases

Epiphysiolysis of the olecranon ulna - 3 cases

Epiphysiolysis dist epiphysis of the humerus - 3 cases (1 laterally, 2 medially)

Distal fibula - 14 cases (3 proximal fibula)

Radius capitulum - 2, distal 5

Base v mt foot bones - 5 cases

2. BONE-TENDONS INJURIES

a. AVASCULAR NECROSIS

This concerns atypical formation of epiphysis in the presence of increased asymmetric training loads. Strong repetitive contraction of large muscle groups near the cartilage growth zone increases traction causing local deformation of immature bone that often remains in the bone maturity. It is characterized by moderate pain with swelling and deformation of the zone which causes later deformation during bone maturity, with often minimal functional impairment.

Osgood Slatter (tuberositas tibiae) - 87 cases

M. Sever (tuber calcanei) - 64 cases

M Freiberg I (MT II head) - 29 cases

M Koller (MT I, navicular bone) - 11 cases

M Sinding Larsen (patella dist) - 4 cases

M Sheuerman (torac spine) - 7 cases

3. MUSCLE-TENDONS AND ENTEZOPATHY (SOFT TISSUE)

They represent a diverse group of injuries and painful conditions depending on the overload zone, intensity and problems durability. Mostly of these are the result of a long, repetitive overload in the presence of an anatomical or structural disorders (varus foot deformity or valgus knee and hip, spine deformity), or bad technique of running, throwing and jumping. Problems are affecting the busiest muscle groups or muscle-tendons structures in the presence of asymmetric intensive training loads. These problems are long-term and related to the load, sometimes lasting for years and become chronic if causes are not corrected. Types and the frequency in my documentation:

Impingement of the shoulder - 34 cases

lateral elbow epikondilit - 32 cases

medial elbow epikondilit - 21 cases

med tension-lat compression syndrom (Little league elbow) – 6 cases

De Quervain (tendovag stenosis abductor pollicis et extensor digitorum) - 17 cases

trigger-finger (tendovag stenosis flexor digitorum) - 9 cases (7 pollicis, other fingers 2).

Tendinitis et bursitis m. psoas - 14 cases

Entesopathia mm adductores osis pubis - 26 cases (cum parc rupt m adduct 5)

Entesopathia m recti abd insert dist pubic - 15 cases (4 parc rupt)

"hipp small rotator et extensor sy" - 3 cases

"snapping hip" - 23 cases

hamstrings sy - 89 cases

"anterior knee pain" - 52 cases

"Jumper's knee" - 37 cases

Iliotibial band sy - 61 cases

M. Hoffa - 7 cases

Sy pes Anserinus (tendonitis, bursitis) - 29 cases

Sy popliteus - 5 cases

Sy tibialis post - 76 cases

tibial periostitis - 57 cases

Sy peroneal - peritendinitis, et myofibrositis - 23 cases

Peritendinitis Achilli - 68 cases

Entesopathia Achilli - 35 cases

retrocalcaneal bursitis - 21 cases

Partial rupt tendinis Achill - 12 cases

fasciitis plantaris - 51 cases

"anterior ankle impingement" - 9 cases

Tendinitis et peritendinitis ext. hallucis et dig - 31 cases

Tendinitis insert dist m. tibialis post - 12 cases

Tendinitis et dislocatio tend mm peronei dist - 17 cases

tarsal tunnel sy - 11 cases

sy sesamoid hallucis - 8 cases

CONCLUSION

Athletics is characterized by the diversity of disciplines in the context of running, jumping and throwing with the trend of early achieving top results, which also stimulates the organization of competitions at world and regional level for athletes in younger categories. This causes the need for different intensive specific training at an early age, in the period of rapid growth, which is characterized by its specific features that increase the vulnerability of the body in the formation. This paper shows the extent and frequency of "over-use" injuries in young athletes and shows their differentiations, with a desire to emphasize the need for the

gradual introduction of the specific training loads, with the introduction of methods for preventing overload syndrome in individual muscle groups by introducing specific exercises and methods of harmonization in development of all muscle groups and stretching to prevent muscle tension caused by rapid growth and strengthening the muscles achieved by training.

Only trainers who adapt their training methods to the specificities of rapid growth and age of the athletes have the opportunity to turn young contestant's talent into top renowned senior result. Otherwise, they can expect many years of training with some of the problems of "over use" syndrome, treatment and often leaving the sport before the senior category, regardless of the initial results and the talent.



General and specific factors in the prevention of injuries in young athletes

prof. Joško Vlašić

ABSTRACT

Maximum achievements in athletics assume optimal choice of stressful operators who run adaptive processes. In order they occurred in series it is necessary to start with training very early and maintain continuity of work. Continuity of work is the continuity of care about preserving the health status. We can consider two basic factors in the prevention of injuries in young athletes: general and specific. General factor includes care for the preservation of immunity, and the specific factors affect the preservation of the locomotor apparatus and we can classify them as: violations that occur as a result of inadequate training process, due to the selection of inappropriate operators, inadequate or overload of specific work, the absence of a special mode in phases of intensive growth and development, violations that occur generated through different times, because of wrong technique, those that occur due to external factors and acute condition of the muscles, and violations that occur due to the wrong set of operators through training.

Prevention takes into account all these factors and also congenital and/or acquired morphological characteristics of young athletes who deviate from the functional atomic structure of locomotor system and includes actions to improve the situation and thus a reduced risk of injury.

INTRODUCTION

Athletics is a sport with long tradition, is widespread throughout the world, and is very interesting in the market. The one that it is gripped by its figures that indicate progress remains its prisoner and a big supporter. To compete with yourself and others, to progress, represents a major motive for the millions of young people worldwide. Of course, not all can be Olympic champions, but they deserve to be promoted in the context of their potential.

The main impediment to such aspirations are injuries. To maintain the continuity of the training process and competition is the basic prerequisite for progress.

Athletics is essentially a sport of maximum human possibilities which are often achieved by very stressful operators that can cause a violation of the musculoskeletal system of athletes.

Injuries are never welcome, but special damage is done when it happens or occurs in young athletes. Cessation of training at the stage when the body has a favorable hormonal status limits the final opportunity for transformation.

In order to achieve a high level of results as seniors one needs to be very early involved in the training process. The criteria of a successful training process are: at least normal increase of the results while preserving stable health status.

MAIN PART

Disease and injury are two very difficult situation for everyone, especially young athletes because it is a period where he needs to build a platform for a stable career. Injury is caused by the impact of one or more negative factors.

General health status

Young athletes are particularly burdened population: school, growing up, training ...

In order to fulfill the full genetic potential a stable health status is crucial.

- General health status is not achieved by action under sterile conditions but raising and maintaining immunity, but in extremely bad external conditions (dirt, cold ...)
- Food, sleep, socialization, bad habits (alcohol ...) (Nancy Clark, 1990.)
- Hygienic conditions (personal and working ...)

Education of young athletes must be present, as they are with themselves for 24 hours and only they can continuously choose between bad and good opportunities.

Information must go from bigger (more important) to the less important ones. Too much information is not good and they are set by importance.

In addition to the clinical picture, it is important to track the objective parameters at least once in 2 months: analysis of blood, urine and hormones.

Special health factor:

Special health factor relates to the health of the musculoskeletal system: muscles, tendons, joints, bones. Without the preservation of these systems, it is impossible to achieve a stable and realistic progressive improvement.

Injuries that occur due to inadequate global training process:

The aim of any training process is to run the desired transformation and it should be a combination of loading and unloading (rest). Training load without phases of rest can not ensure the adaptation and progress and certainly are a large factor that causes a violation of the locomotor system (Malacko-Rađo, 2004).

Injuries due to poor choice of operators:

The basic unit of the transformation is an operator which is defined by the content (trajectory of movement of individual body segments), mode of operation and load as the product of volume and intensity.

The operator should be appropriate for the biological development of young athlete, his sporting internship, health status, and should be positioned on the adaptation of previous less stressful operators. Although the young body can endure and partially stressful operators (override the hierarchy of stress) it shouldn't be brought into temptation for two reasons: first is that it is a shame to skip operators in the process of gradual adaptation, and the other is that the big difference in the ability of the system and the stress of the operator can lead to serious harm (Tudor Bompa, 2001).

Injuries due to a lack of specific work:

Kinesiological theory affirms the principle from the general to the specific. Still, we should be very careful because the general work can make a negative transformation of the system which can prevent the necessary progress of results. Only specific stress gives specific adaptation.

When you have already started using specific operators, then the athlete is more adapted on them or on similar operators than on some general operators. Therefore, general operators can cause a violation of the musculoskeletal system of athletes.

Injuries in relation to the stages of growth:

Very critical period of young athletes is when it comes to uneven growth and development of individual segments of the musculoskeletal system. Accelerated bone growth in length can not keep the strength and muscle power. In such periods emphasized plyometric training should be avoided, and in order to preserve the maximum excitation we must use operators for unloading (sliding slope with an incline, elastic cords and similar).

Injuries that occur due to the time that they manifest:

Given the time that the injuries of the locomotor system occur we can distinguish explicit ones, that happen clearly at a certain point at the training activities such as eg. a pulled m. biceps femoris while sprinting or ankle sprain while jumping.

Those that occur because of one or more adverse factors (fatigue, cold, lack of concentration ..) can be very unpleasant. But their cause is mostly clear. Much more dangerous situations are when there is a systematical mistake through the training process that gradually undermines the stability of the system. Initially subsystems compensate the problem, but when they give in, then it comes to a lot of damage that usually demands a longer recovery.

The review of the work program is important in order to foresee these states.

Injuries because of inadequate techniques of performing certain disciplines:

Without proper technique it is difficult to achieve even remotely remarkable result. For young athlete it is of essential need to learn (to train) proper technique of the discipline. Poor technique generally limits the result, or can generalize injury.

In addition to anomalies in the technical training of the basic disciplines it is necessary to properly train young athletes in the techniques of each content that is included in their training process (Bruno Pauletto, 1991) because any deviation in a shorter or longer period of time can generate serious violations of locomotor system.

Injuries related to the phase of the training process:

Assessing the possibility of injuries during phases of the training process it is higher at the beginning of the period and at its end. Compared to the

microcycle it is the first day and the last day of the microcycle. Concerning the daily regimen morning training session is more dangerous while in a single training unit it is riskier the very beginning and very end of the training.

The start of each work in these segments is fraught with inadequacy of muscle tone and not enough warm-up of the coordinating routes, and the last phase is fraught with fatigue, concentration decrease, increasing the acidity of muscle ...

Injuries of the musculoskeletal system due to general health factors:

General health factor affects the state of the musculoskeletal system, utilization and adaptive processes.

Lack of sleep, inadequate nutrition, clothing, hygiene, taking into account the health of your teeth etc., highly increases or decreases the risk of harm.

Injuries in relation to the outside temperature:

The speed-explosive disciplines require that the muscles are less viscous. Outside temperature increases the speed of muscle contraction and relaxes antagonists, and thus reduces the risk of harm, and the work is more efficient. The warm climate and insolation affects faster and better recovery and utilization of the training process. Therefore, highly intensive work should be avoided in low temperature conditions. Implementation of the training period in the warmer regions is the usual sports practice.

Injuries compared to the muscle condition:

Muscles work efficiently if it is appropriately tense (toned) before extreme effort and the possibility of injuries is reduced. We should pay attention to the fatigue that is reflected in a lack of concentration, and may be manifested at the local level of saturation of lactic acid.

Injuries in relation to the algorithm operator - warm-up:

In order to reduce the potential harm and increase work efficiency, the body needs to be adequately prepared, warmed, for work, and especially for the work of maximum intensity.

Warm-up should be amended by dynamic operators from smaller to larger intensity and medium to high specificity in relation to the main training job, with adequate rest between them.

Passive stretching in this approach should be avoided because it is too far from the basic task of the regime.

Prevention and control:

Prevention is a set of measures that we have included in the program for the protection of injuries:

- control of posture (body symmetry) and uniform static and dynamic load (proper posture and skeletal anomalies)
- control: blood / detailed-hormonal status / urine (longitudinal tracking)
- clinical picture (your subjective feeling - signals which should be recognized and taken into account)

Recommendations on the prevention of musculoskeletal system:

- Considering the body as a whole is the basic postulate when thinking about prevention of musculoskeletal system injuries

- Tendons and muscles that are located around the center of gravity of the body (pelvis and lower back) have to be extremely strong and somewhat elastic. Small shifts in this part of the body cause a big boost in the distal parts of the body, such as the ankle joint and foot. The clash of these parts of the musculoskeletal system with the surface represents a great stress and they should be paid great attention to the prevention. Besides this, the quality of this subsystem is very important in quality results in all athletic disciplines.

- Do not neglect any part of the body (topological). Each of them takes part in the successful implementation of motion.

- No slavery to some well-established notions entrenched in athletics for example: gym as the only way to improve the strength and power...

- Preserve good state of health of the spine, joints and global muscle strength

- Prefer multiple-joint exercises because they operate within the system (synergy) with others

- Antigravity oppose gravity exercises
- Development of strength using your own body for young athletes
- Exercises on one leg in order to reduce pressure on the spine (mainly actions in track and field are taking place on one and then the other leg)

Example of action on the ankle joint and the process of adaptation to the force (strength) expressed by the speed and momentum of transition from de acceleration to acceleration

Injury of the ankle joint most often occurs in the extreme positions of the foot relative to the lower leg and the action of relatively large forces in a small period of time.

To reduce the possibility of injury of this very important and highly loaded joint it is necessary to take into account that the joint has a full anatomical flexibility, as well as all other joints, knee, hip, spine (Mraković-Bradic, 2008).

The tendons and ligaments must be strong and flexible, and this is achieved using a number of training units with the aim to bring its adaptation to the level corresponding to possible critical situations in a particular sport:

1. Elastic band or rope
2. Fin
3. Proprioception on one foot
4. Balance on one foot on a soft surface
5. Balance on bosu ball
6. Balance on air cushion
7. Balance on the hemisphere
8. Balance on a hanging board
9. All above with one eye closed
10. Throne (construction) - sudden stopping loads in primary joints
11. Difficult movements (in a circular arc - different radii)
12. Lands with one foot on the mat, bosu ball or other substrates with different tasks and different speeds

CONCLUSION

The basis of every training process is to start adaptation process. Athletics is a basic sport that touches the peak of human ability. Young athletes in the early stages of their career set the basis for the expression of their full potential. To preserve the continuity of proper training is the

basic requirement without which you can not reach goals. Comprehensive procedures at several levels which take account of any stable health status of every young athlete are crucial for the improvement of results. In this sense, we can expect further expansion of the results and the highest peaks to unimagined distance.



Doping in sport - health and other aspects

Dr. Aleksandar Vujičić

Doping can involve the use or attempted use of a variety of substances, processes and procedures in order to artificially increase the physical and other capabilities, and are prohibited by the competent international or national institutions. The word "DOP" is of Dutch origin and refers to the alcoholic beverage in South Africa used as a stimulant by Zulu warriors.

REASONS: The reason for their ban is their hazard to human health and the scaling up of human potential. Most of these compositions and methods are used to treat certain conditions, often in smaller doses and strict indications. Also, there are products that are useful for the recovery, are not considered as doping and harmful effects to the organism are not noted in prescribed dosages.

DANGER: Taking any ergogenic preparation carries the risk of possible entry of prohibited and potentially illicit substances that are often not listed on the packaging. A number of papers cite testing of the preparation (Geyer et al.). The papers state that potentially prohibited substances were found in an average of 14.8% of the preparation in several countries, of which the most frequently Netherlands 25.8%, Austria 22.7%, UK 18.9%, USA 18.8%.

EVIDENCE OF USE

- Positive result A and B blood or urine samples (or only A)
- The possession and distribution of doping
- Failure to appear for a doping control (in competition) or out of competition (filling failure or missed test)
- Use of prohibited methods or procedures
- Help or incitement to doping
- An attempt to modify the integrity of the sample or specimen planting
- Recognition of doping use

PROBLEM OF DOPING

Survey among 190 athletes from Olympics in Los Angeles revealed that 76% of them said YES to the following question: would you take unauthorized means assuming that you will take an Olympic medal without being discovered, with great possibility of death within 5 years?

Survey (Bamberg et al., 1997.): Question A) would you take unauthorized product that would boost your result and led to victory and not get caught (out of 198 surveyed 195 YES, 3 NO). Question B) Would you take a product that would enable victory in all competitions in the next five years, with the knowledge that you will certainly die of side effects (more than 50% athletes said YES). Such tests represent an alarm and talk about state of mind in which competitive athletes live, when victory and glory become the purpose of life and more important than life?

HEALTH DANGER - increasingly common death outcomes in athletes that are connected with the consequences of doping, as well as permanent health damage in athletes.

ETHICAL PROBLEM - there is a question of morality to beat an opponent who has been diligently practicing for many years, to take the glory and material gain by using doping that has artificially increased capacities

LEGAL PROBLEM - in several countries the possession and distribution of doping is misdemeanor or punishable.

VALIDITY OF RESULTS - the results are not valid if they are achieved by means of doping

CAUSES OF DOPING

- **COMMERCIALIZATION OF SPORT** - sport has become a significant source of income for both the athletes and managers, manufacturers of sports equipment and commercial agencies. Awards allow athletes to solve existential problems and often give an easy life in the long term along with social recognition and glory. All this gives a significant motive for the use of doping.

ADVANCEMENT OF SCIENCE - Medicine and pharmacology constantly synthesize or introduce new pharmacological agents for improving human capabilities and recovery of human body. There is an annual change in WADA prohibited substances under certain criteria, but often after a period of its use for lawful purposes.

INTRODUCTION OF NEW TRAINING SYSTEMS - enabled a tremendous increase in human achievements with the help of more training per day, different scope, specifics and intensity. This calls into question the quality and speed of recovery from frequent intensive training, and because of

the intensity of the necessary training and the level of quality results, brings the concept of talent only as a “ticket” to intensive quality work and a possible result.

DENSE COMPETITION CALENDAR - the number of competitions where athletes must constantly prove a high level of readiness and results is rising. It often happens on big competitions that athletes have morning qualifications, where they have to reach its maximum to enter finals which are often the same day afternoon, or more consecutive days of qualification and final race after that. Such trend raises the question of rapid recovery and fatigue in athletes, and creates the need for taking ergogenic products as an aid to recovery.

HISTORY - In 1886 the death of English cyclists due to the use of stimulus “trimethyl” can be considered the first documented doping. In 1938 German scientist Werke discovered a drug called Pervitin (methamphetamine) and put it on the market. It is alleged widespread use of Pervitin in Germany and in athletes and soldiers before, during and after the Second World War. In the same time US soldiers in the same war started to use amphetamine. All this culminated in 1964 on Olympic Games in Rome when a Danish cyclist died due to the use of amphetamines. In 1952 and Olympics in Helsinki, the first use of anabolic steroids in the USSR was noted. In 1987 the death of Bridget Dresel (GER) - javelin thrower where the body was found after 101 substances, talks about the escalation of taking more variety of substances.

CLASSIFICATION

A) PROHIBITED IN AND OUT COMPETITION

S0 - PREPARATIONS NOT REGISTERED FOR HUMAN CONSUMPTION, THE TEST PREPARATIONS AND PREPARATIONS FOR VETERINARY USE.

S1 - Anabolic Agents (endogenous and exogenous): nandrolone, stanozolol, THG, testosterone (testosterone and epiandrosterone ratio < 1: 4)

S2 - Peptide Hormones, growth hormone and similar - SUBSTANCES - growth hormone (GH), erythropoietin (EPO), horigonadotropin (HCG), IGF-1 and the like.

S3 - BETA -2 agonists (Salbutamol- inhale limit 1600 mcg / 24 h, max inhale formoterol 54 mcg / 24h, salmeterol)

S4 - HORMONE AND METABOLIC MODULATORS (insulin, anti-estrogens substances - clomiphene, selective estrogen receptor modulators-tamoxifen)

S5 - DIURETICS AND OTHER MASKING AGENTS (probenecid, albumin, dextran, mannitol and all diuretics)

PROHIBITED METHODS

M1 - MANIPULATION WITH BLOOD AND BLOOD COMPONENTS (administration of blood, blood products and blood cells, means of oxygen transport, hemoglobin, and similar substances; and every kind of manipulation of blood and blood components in the physical and chemical sense).

M2 - CHEMICAL AND PHYSICAL MANIPULATION (intravenous infusion or injection of more than 50 ml for 6 h except legal medical treatment, as well as any kind of change in the integrity of the sample and the planting pattern.

M3 - GENE DOPING (transfer of polymers of nucleic acids and analogs in order to increase sporting performance, as well as the use of normal and genetically engineered cells).

B) SUBSTANCES AND METHODS PROHIBITED IN COMPETITION

S6 - STIMULANTS

a) non-specific (amphetamine, cocaine, methamphetamine, bromantan)

b) specific (ephedrine and meilefedrin above 10 mcg / ml in urine, pseudoephedrine above 150 mcg / ml in urine, Cathine above 5 mcg / ml in urine, adrenaline except for local use, etc.)

S7 - NARCOTICS (morphine, methadone, diamorphine (heroin), fentanyl, pethidine etc.)

S8 - CANNABINOIDS (natural - hashish, marijuana; synthetic - THC, etc.)

S9 - GLUCOCORTICOIDS (prohibited only for oral systemic use, iv, im, ir)

DOPING EFFECTS

1. STIMULATORS - repair concentration and aggressiveness, speed up reflexes, reduce feelings of fear and pain.

It is used in medicine for depression and brain diseases.

The danger lies in potential exhaustion which is sometimes fatal due to the impairment of inhibitory defense mechanisms of overload. Taking stimulators leads to insomnia, headaches, anxiety and even psychosis.

2. ANABOLICS - They fix metabolism, leading to muscle growth, increase of strength and endurance.

Use in medicine: in exhaustion, after surgery conditions, osteoporosis and cancer.

Undesirable effects:

a) General: acne, high blood pressure, liver damage (increase in transaminases), lack of immunity, disorder of lipoprotein, aggressiveness.

b) Male specific: impotence, gynecomastia, decreased sperm production, testicular atrophy, adenocarcinoma of the prostate.

c) Female specific: increased hair growth of male type, gruff voice, breast reduction, cycle disorder

3. PEPTIDE AND GROWTH HORMONES - They act as anabolics, only stronger and more specifically, EPO - an increase in the number of red blood cells.

Use with hormonal weakness of pituitary gland, placenta and kidneys.

Side effects of hormonal status are often: hypersecretion of hormones, relising hormone dysfunction, occurrence of diabetes and cancer, depending on the target organ hormones. EPO: Increased blood viscosity due to an increase in red blood cells with the risk of thrombosis and heart attack during and after competition with dehydration as a precipitating factor).

4. BETA 2 AGONISTS - use in asthma and bronchitis, allergic states (relaxation of smooth bronchial musculature and facilitation of breathing).

For the purpose of doping is used for relief of breathing and as a stimulant, anabolic effect (Beta-2 agonist Kleinbuterol has anabolic effect in S1-2, due to the increase of glycogen capacity of cells and changes in the type of muscle fibers, as well as causing hypertrophy of cross-striped muscle cells).

Side effects and adverse effects are palpitations, tremor, anxiety, insomnia, sweating and rapid heart rate, which can lead to arrhythmias.

5. HORMONAL AND METABOLIC MODULATORS - regulate work and synchronisation of hormones as well as metabolism. When using these substances disruption of hormonal functions is possible, depending on the target organ, which often remains permanent (tamoxifen, Clomiphene, menstrual cycles disorders). Insulin causes diabetes because of compensatory induction that reduces its own production of insulin).

6. DIURETICS - increase urine output. They are used in heart, liver and kidney disfunctions. For the purposes of doping are used for rapid excretion and to camouflage illicit funds.

The danger of their use is dehydration - loss of fluid and electrolyte - mineral after training load with possible serious complications.

7. GROUP S7 (narcotics - heroin, morphine and derivatives), S8 (cannabinoids - hashish, marijuana, THC) and S6 (non-specific stimulators of amphetamine, cocaine and derivatives) are DRUGS with all the features of addiction.

8. GLUCOCORTICOIDS - prohibited as preparations for systemic use, because of the complex metabolic disorder (Cushingoid syndrome, fluid retention, the possibility of occurrence of diabetes), their anabolic effect is significant in systematic use.

The concept of SPECIFIC SUBSTANCES was introduced except for S1, S2, S4.4, S4.5 and S6.a, M1, M2 and M3 groups whose use can cause reduced sentence if they are found incidentally and there are no evidence of taking it in order to increase sporting ability.

DANGER OF DOPING

The possibility of development of TOLERANCE to the substance because of addiction to the illicit drugs (the need to take larger doses to achieve the same effect in practice or competition), the development of PSYCHIC ADDICTION (fear and insecurity appears if one did not take an asset), the emergence of PHYSICAL ADDICTION - abstinence crisis is known for S7, S8 and S6 groups as real addictions.

CONCLUSION

Taking illicit funds to artificially enhance the human ability is banned because of their harmful effects on the organism, and the consequences of their use can be permanent and fatal. Because of this doping controls are increasing at competitions and in preparation periods. However, sophisticated preparations which are not doping are allowed, but their use should be initiated only after consulting a doctor.

AUTHORS

Dr. ALEKSANDAR VUJIČIĆ

Born 1959 in Sarajevo, elementary and high school finished in Bar, Montenegro. Medical University finished in 1984. in Novi Sad, and specialization in orthopedic and traumatology 1994. in Belgrade, post graduated 1998. in sport medicine.

From 1975-1986 active athlete-middle distance runner, Montenegrin record 800m holder 1984-1996.

1989. starting cooperation with Yugoslav Athletic Federation as medical doctor.

From 1994 - 2006 president of medical and antidoping commission of Yugoslav Athletic Federation, team doctor of Yugoslav Athletic Federation, from 2001. member of medical department Yugoslav Olympic Committee.

1998. in Belgrade and 2004. in Novi Sad organizer and responsible for medical assistance and doping control on European cup –second league.

From 2006. President of medical and antidoping commission Montenegrin Athletic Federation

From 2006 - 2010 vice president of Montenegrin Athletic federation, and from 2010. member of board of directors Montenegrin Athletic federation.

From 2009. DCD EAA (antidoping delegate EAA, repeated election 2013.)

From 2013. member of Montenegrin National Antidoping Agency.

Living and working in orthopedic practice General Hospital in Bar, Montenegro, married, two boys.

JOŠKO VLAŠIĆ, prof.

Born in 1956., graduated in Zagreb at the Faculty of Kinesiology. He has made his first and last active sporting career steps at the Athletic Sporting Club "ASK" Split. He won over 30 Croatian champion titles in many athletics disciplines.

Five years in the row (1979 – 1983) he was the champion of ex-Yugoslavia in decathlon, bronze medallist at the Mediterranean Games in Split, gold medallist at the Mediterranean Games in Casablanca, record holder of ex-Yugoslavia and still the record holder of Croatia.

In 1983 he was the Croatian Athlete of the Year, and Split's best sportsman.

From 1994 to 2001 he was professional trainer at his parent club ASK Split, and later on in a couple of primary and secondary schools in Split. He was also fitness trainer of Basketball Club "Split – Croatia osiguranje". Since 2006 he is professional athletics trainer at the Croatian Athletics Association.

He trained a lot of successful athletes:

Đulijano Koludra – Croatian record holder at 100 meters sprint (1996),

Jelena Kostanić, - tennis player (1993 - 2000),

Marko Žaja – World and European champion in kick-boxing,

Nikola Vujčić – international basketball player (Vlašić is his personal fitness trainer) who won three European titles (Euroleague) playing for Macabi,

Croatian National Basketball Team.

Vlašić is active as educator at basketball seminars, and guest educator at the Faculty of Kinesiology in Zagreb, where he taught General Fitness of Athletes. He also educates internationally and writes professional books.

His daughter **Blanka Vlašić** is also under his training, and she is globally dominating high jump in the last ten years. She won gold medals at world and european championships and Olympics in Osaka (2007), Berlin (2009), Valencia (2008), Doha (2010), Barcelona (2010), silver in Beijing (2008), Degu (2011), Moscow (2006), etc. She had 11 wins in the competition of Golden League, won the Diamante League (2010), and had the second best result of all times in Stockholm (2007), etc. She's been chosen for the best athlete of the World in 2010 by the World Association of Sports Journalists.

Joško Vlašić was the best trainer of the year repeatedly by the Croatian Olympic Committee, Croatian Athletics Association and the City of Split. He also got state recognition "dr. Franjo Bučar", and was decorated by the President of the Republic of Croatia.

Mgr. MICHAL POGÁNY

Training Expert, coordinator for Hungary, Slovakia and Czech Republic.

Born in 1961., Slovak by origin, lives in Brno, Czech Republic. Graduated in 1985 at Comenius University in Bratislava – Faculty of Sport.

- 1986 – 2001 – head coach in primary sport school in Dunajská Streda – Hungarian teaching language

- 1989 – 1992 – Czechoslovak National coach for high jump – women

- 1996 – 2007 – Slovak National coach for jumping events

- from 1989 -2013 his athletes participated **every single year** at the European and World Junior Championship, World Championship – U 17, European Championships U 22, European championship, World Championship and Olympic Games

- 1982 – 1985 – He represented Czechoslovakia in High Jump

- 1983 – Slovak record holder in High jump - 2.21 m

- He also played the premier leagues – basketball, handball, volleyball.

For the past 15 years he has been working as a stretching and conditioning trainer for tennis, football, ice hockey, Czech national volleyball women team, Czech national basketball men team - U19.

- Selected achievements of his athletes:

HAJNALKA VÉGHOVÁ /junior / – high jump - 1.86 m : Silver - Družba 1990, Bronze - Družba 1989, 5th - JWCH - 1990

ŠÁRKA KAŠPÁRKOVÁ - triple jump – 15,20 m : Gold - WCH 1997, GOOD WILL GAMES 1998, UNIVERSIADE 1995, SILVER - ECH 1996,1998, Bronze - OG 1996, IWCH 1997, 1999

ZUZANA HLAVOŇOVÁ-KOVÁČIKOVÁ – high jump – 200 cm : silver-Indoor WCH 1999, Indoor ECH 2000 , 4th WCH 1999 , finalist OG 2000

RENÁTA MEDGYESOVÁ / junior / – high jump – silver WCH-1999 U 17, 5th WCH 1999 U 17 triple jump, JWCH 2002

ROMAN NOVOTNÝ – long jump – 821 cm- finalist OG 2008, ECH 2010, IWCH 2011

BARBORA LALÁKOVA – high jump – 199 cm – Czech indoor record holder

In addition to the above, he has trained 21 athletes who represented Slovakia and Czech Republic in Junior and Senior categories.

He is the only Slovak athletic trainer with the title of Mister of the World.

3.2. TRAINING CAMP 2 - BRNO - 17. - 27.08.2014.

Schedule of events:

- ELOD TOLGYESI, lecture "Sprint-power development without lifting weights with great weight"
- ŠARKA KAŠPARKOVA, lecture "Prevention training As preparation for achieving top results"
- IVICA JAKELJIĆ, lecture "Athletics throws - preparing young throwers in order to prevent of injuring"



Power development without lifting weights with heavy weights

Elod Tolgyesi

A well-constructed strength and conditioning programs are based on the application of sound principles during each step of a process called program design. The method is grouped into three content areas:

- resistance training
- plyometric training
- speed, agility and speed-endurance development

Most elite athletes use some form of plyometric exercise to improve the agility, speed, and power necessary for explosive movements. Plyometric exercise is a training protocol used to get your muscles to create the greatest force in as little time as possible. The foundation that plyometric exercise is based on is the stretch-shortening cycle (SSC). Because of the SSC, you can generate more force by prestretching a muscle immediately before a concentric muscle contraction than when performing a concentric muscle contraction alone.

To better understand the physiology of the stretch-shortening cycle, think of your muscle as a rubber band. When you stretch out a rubber band, you create an elastic force in the band. Because of the rubber band's elasticity, the strain created by the stretch causes the rubber band to return, if possible, to its original shape. Your muscles have an elastic component to them and, similar to a rubber band, will attempt to return to their original state in response to any sort of stretch. Fundamentally, this is how the stretch-shortening cycle works in the body. Plyometric exercise tries to combine the natural physiological SSC characteristics in the muscles with strength and power to create a truly explosive movement. To better describe how a plyometric activity works, consider the example of a two-legged standing long jump, focusing primarily on the quadriceps muscle group on top of the thighs. (Note that other muscles are used in this movement, but for purposes of simplification, we will not discuss them.) Before the initial takeoff, the long jumper dips down a bit, forcing the quadriceps to eccentrically contract and stretch the muscle. Soon after,

the quadriceps will concentrically contract, causing the leg to straighten out and spring off of the ground (eccentric and concentric contraction). Plyometric exercise focuses on training the period of time between the eccentric and concentric phases.

The transition period between the eccentric and concentric phases is known as the amortization phase. Quickly transitioning through the amortization phase enables the body to generate a powerful contraction using the SSC. But the body can only produce this additional power when the amortization period is relatively short, typically in the hundredths of a second. This short time frame allows the elastic component and the stretch reflex to add power to the relative strength of the muscle. Plyometric exercises focus on training the muscles to quickly move through this amortization phase and thereby produce more powerful movements. By minimizing the amortization phase and improving the SSC, you can learn to run faster, jump higher, and perform better than you have before. Plyometric exercises are rarely done in a public fitness setting; rather, they are usually performed in an athletic strength and conditioning setting. Fortunately, a variety of plyometric exercises can be performed with various pieces of equipment that are easy to find, such as sturdy wooden boxes or crates and weighted balls. One of the most popular plyometric exercises is the depth jump. For this exercise, you begin by standing on a box. You then step off the box, and upon landing on the ground, you push up and jump as high as you can with both feet. Depth jumps are frequently used to train basketball or volleyball players to jump higher. A variety of plyometric exercises can also be performed with the upper body. Upper body plyometric exercises commonly involve medicine balls. The chest pass is one example of a medicine ball exercise; it can either be performed with two people passing the ball or with one person throwing against a wall. Basically, you use a chest pass to throw the ball to another person (or the wall), and when the ball is returned to you, you immediately throw another chest pass. This plyometric drill focuses on training the upper body to produce powerful throwing or pushing movements, such as those used when passing a basketball or when blocking in football. As with any other type of resistance training, there are many benefits to performing plyometric exercises. You get many of the same benefits of other types of strength and power training, such as increases in muscle and bone strength. Additionally, because of the nature of plyometric exercise, you improve functional power. In

other words, since the movements of plyometric drills mimic those that are used during athletic activities, they produce improvements in power and performance that transfer to those activities. This is one of the main reasons plyometric exercises are primarily done in athletic strength and conditioning settings. With proper plyometric training, athletes can learn to use the maximum power their body generates on the court, track, or playing field. Like many other types of exercise, plyometric exercise has its drawbacks and limitations. First, most public fitness settings do not have the appropriate space and equipment for plyometric exercise (though as we previously mentioned, with a little imagination, you can create your own equipment from items such as sturdy wooden boxes). And because of the highly intensive nature of plyometric exercise, it should not be performed without a proper strength foundation. Build up a routine training program and develop a minimum base of strength before adding plyometric activities. Then, learn the proper techniques for performing these exercises from a trained professional or another reliable resource. In addition, these activities should be performed no more than two or three times per week so that your muscles have time to rest and recover from the activity. As you can see, plyometric exercise can be very beneficial to people trying to maximize the power that their muscles can generate. These exercises can help you improve your athletic performance while giving you an active, high-intensity workout. Realistically, plyometrics need only be performed if you are taking part in competitive sports and you want to exploit every last bit of power your muscles can generate.

LITERATURE

Thomas R. Baechle, Roger W. Earle : Essentials of Strength Training and Conditioning-3rd Edition



Prevention training as preparation for achieving top results

Šárka Kašpárková,

the World champion and Bronze OG medalist in triple jump, (PB TJ - 15,20m, HJ – 1.95 m)

In the beginning of the lecture I introduced all athletes with my career and best results. I tried to explain that versatility is important from a young age, and is a prerequisite for preventing injuries. A very important role in this process is the coach and his educational level and avidity.

I began with basketball at the age of 10, later, when I was 12 years old, I began attending the Sport elementary school with focusing on athletics. We spent lot of time with versatility and our teachers also put emphasis on regeneration (eg. swimming) and stretching as a precaution against injury. In age 15 in high school I have started to specialize high jump. We had professional facilities both for training and for regeneration (swimming, sauna, massage). For this reason I avoided injury. In high school I also achieved my first successes - 6th place at WJCH, 3rd at EJCH with PB 1.91 m.

After these successes a crisis period begun when I was too heavy as a high jumper and first injury occurred. I even thought about retirement. Fortunately, I got into the hands of an experienced trainer and doctor and have overcome the crisis period and realized that I must devote maximum recovery time to prevent injury. Ideally, it should be the rule: as much an athlete trains as much he must regenerate. I tried to spend my time for regeneration after every training day (1x swimming, twice sauna , 2x massage and stretching).

We have worked well with experienced physiotherapists. Because of this I preceded serious injuries and the fact that I could do athletics at the highest level in 35 years was amazing. I also presented a series of exercises for young athletes, that they should exercise in the morning after waking up or one hour before the race to avoid injury.

Athletes I have met also used devices in practice to regenerate - psychowalkman, an electrical device Rebox, electric hedgehog. I tried to

explain to them that regeneration is an integral part of the training and they need to devote sufficient time to regeneration for avoiding injury.

In the final discussion, I got a lot of interesting questions about my top sporting career. The entire lecture was held in a very pleasant atmosphere and I'm glad I was able to pass my sport experience to the young athletes and that it can help them to further grow in their athletic future.

In conclusion, I showed my most precious medals to young athletes and gave them all a self-signed photo. I was glad I could be the part of this project, which is guaranteed by the Croatian athletic club ASK Split under the auspices of the EU and share my experiences and advices on how to prevent injuries.



Athletics throws - preparing young throwers in order to prevent of injuring

prof. Ivica Jakeljić

The concept of throwing can be defined as any activity in which the person seeks to “transfer” an object like a ball, a shot or a disc through the air using own hands. Those movements containing a series of individual movements of legs, torso, upper arms, forearms and hands. This sequence of movements is influenced by many factors. One of them, the purpose of throwing, depends on the activity. In some sports, the purpose is to throw accurate, as in baseball or basketball. In track and field throwing disciplines aim is to achieve the greatest possible length of the throw - shot, disc, javelin and hammer. Other factors that partially determine the nature of throwing are the restrictions and rules: space limitations (circle for shot put, length of javelin runway, limits for the field of throw), and the technical limitations of a specific discipline. Third, throwing movements depend on the ability to produce appropriate movements. This ability is determined by the individual’s training and his anthropometric characteristics.

Taking into account the above, every throw is a result of interaction between athlete’s neuromuscular and musculoskeletal system. The success of the throw is directly related to the effectiveness of the body to produce a series of movements characteristic for the throwing technique. Throwing distance is characterized by the parameters of the throw (speed, height and angle), gravity, aerodynamic reconciliation (form), the influence of the environment (wind, air density), temporary position of the foot and ground reaction force.

This paper will present the basic guidelines for technical performance of components of javelin throw with the aim to prevent injuries that may occur with the poor performance of the throw.

Contrary to popular belief that the javelin throw is a simple hand throw, this discipline uses the activity of the whole body. Even small deviations from the correct technique will shorten the length of the throw, but also badly affect the joints, ligaments and tendons. Anthropology of javelin

thrower is characterized by a combination of motor skills: strength, speed, coordination and flexibility, as well as athletic morphological structure. Training needs to contain exercises for: run-up, starting the throw from the legs and hips with effective transition of center of gravity of the body forward, torsion with a maximum postponement of stretching the hand, blocking the left hand (for right-handers), long-term acceleration of throwing hand.

Exercises for javelin throw are: standing javelin throw, throwing a medicine ball (both hands) standing, throwing heavy objects (with one hand, harder balls, fake javelin) standing, throwing balls over head (4 and 6 kg), javelin throw with a running start from 3, 5 and 7 steps, exercises for the momentum (carioca, sprints with a javelin, cross running with a javelin, cross running and pulling weights from 2.5 to 5 kg), and other exercises (vertical jumps, depth jumps, hops over hurdles or crates, simulation exercises with elastic rubber, exercises with a pulley, outbursts and strokes (one-handed and both handed)).

COMMON ERRORS AND CORRECTIONS

Example 1.

Error: Too much angle during throw-out

Correction: While cross-stepping back fist must remain up and the center of gravity of the body raised and forwarded to avoid lowering the javelin.

Example 2.

Error: Inefficient transfer of the center of gravity of the body.

Correction: The steps need to be carried out aggressively, in low and long movements. The upper part of the body must be behind the center of gravity - a sitting position.

Example 3.

Error: Insufficient blocking of the other side.

Correction: The athlete need to knowingly export sturdy block and stop the left leg, the left part of the body and left shoulder and expedite the movement of the right side.

Example 4.

Error: Bending the left leg (excessive flexion while stopping)

Correction: The athlete has to carry the weight high over the left leg, and not jumping on it.

Example 5.

Error: Putting the front foot out too much.

Correction: The throw must wait until the front foot comes to the ground.

Example 6.

Error: Invalid mental attitude during the competition.

Adjustments: Before and during the competition methods of relaxation should be used (deep breathing exercises, listening to music, etc.)



Authors

ŠARKA KAŠPÁRKOVÁ

Born May 20, 1971 in Karviné, is a Czech athlete, basketball player, a former athlete and a triple jumper. The athlete whose life partner is her coach Michal Pogány, the bronze medalist from the 1996 Olympics in Atlanta and World Champion in 1997. Ended athletic career in 2006, but returned to the senior sport three years later. For the municipal elections in 2010 became a candidate for Mayor of sovereignty Brno.

In elementary school, began first with basketball, but soon switched to athletics. After leaving high school sports in Brno focused primarily on the jump. At the Junior World Championships in 1988, held in Canada in Sudbury, finished in sixth place. A year later she won the bronze medal in the junior athletic championship in Varaždin, former Yugoslavia. Followed by a sharp dip in form, which stopped until the beginning of cooperation with the coach. Thanks to him, managed to qualify for the 1992 Olympic games in Barcelona. There, however, lagged by 4 cm behind her former personal maximum, which was also the qualifying limit to advance to the finals.

Table of best performance in the high jump in each year

1985	- 1.68m
1986	- 1.79m
1987	- 1.80m
1988	- 1.89 m
1989	- 1.91m
1990	- 1.81m
1991	- 1.78 m
1992	- 1.92m
1993	- 1.95m

Triple Jump

In 2006, the end of her career, but back again to help the team USK Prague club. At the European Cup in Athletics ensured the participation of the European Championships in Gothenburg. Her

participation in the absence of full training technology, however, has been rather symbolic. In the sports environment, however, wants to move further. With her partner and coach has a daughter Terezka. Holding a Czech record in the triple jump on the track and indoors. In 1997 she won the World Championships in Athletics in Athens performance of 15.20 meters, a national record (and sixth place in the historical world tables). Two years later, in Maebashi, Japan jumped 14.87 meters indoor, which also was a Czech indoor record.

Achievements

1989 MEJ, Varaždin - 3rd place (height)
1993 World Universiade, Buffalo (USA) - 2nd place
1995: The World Universiade, Fukuoka (Japan) - 1st place
1996 HME, Stockholm (Sweden) - 2nd place
1996 Olympics, Atlanta - 3rd place
1997: HMS, Paris (France) - 3rd place
1997 MS, Athens (Greece) - 1st place
1998 HME, Valencia (Spain) - 2nd place
1998 ME, Budapest (Hungary) - 2nd place
1999: HMS, Maebashi - 3rd place
1999 MS, Sevilla (Spain) - 6th place
2000 OH, Sydney (Australia) - 12th place
2003 MS, Paris - Qualification
2004: HMS, Budapest - Qualification
2005 HME, Madrid - 4th place
2005: MS, Helsinki (Finland) - Qualification
2006 ME, Göteborg (Sweden) - Qualification

IVICA JAKELJIĆ

Date of birth: 04/20/1970.

Nationality: Croatian

Education: Higher Education - Professor of Physical Education

Marital status: Married

Languages: Croatian, English, German, Polish

Driver: B, C categories

Work experience:

Since 2004 he works as a trainer in the athletic throwing disciplines in Athletic Club ASK Split.

Since 2006 he has served as a head of the expert team at Athletic Club ASK.

He has worked as a coach in Croatian athletic team in the throwing events.

Since 2004 he has worked as an associate at the Faculty of Kinesiology, University of Split on collegium Athletics.

Member of the expert committee Croatian Athletic Federation in charge of athletic throwing disciplines.

Since 2007, an associate of the Croatian Paralympic Committee

He was a technical manager in the organization of the Continental Cup at 2010 year.

Since 2013 the chief coach of the projects co-financed by the European Commission HEALTH AND PREVENTION OF INJURY IN YOUNG ATHLETES

From 2005 to 2009 collaborated with the Polish Athletic Federation (Olympic coach Peter Zaitsev)

Worked with and learned from many top coaches: Ivan Ivancic, Vladimir Kevo, Helge Zoellkau, Valery Orlov, Anatolly Bondarchuk, Czeslaw Cybulski

TRAINING CAMP 3 - MAKARSKA - 28.03. - 05.04.2015.

Third camp was held in Makarska. Accommodation was in the hotel "BIOKOVKA".

The speakers were:

- doc. dr. sc. Frane Žuvela
- dr. med. Mirjana Bezdrov



Functional assessment of the locomotor system - what steps can we take to prevent injury

Doc. dr. sc. Frane Žuvela

1. INTRODUCTION

Internal risk factors:

- Physical characteristics - age, gender, body composition, health status, level of fitness, anatomy, the level of acquired sports skills...
- Psychological factors - motivation, perception of risk situations, willingness to accept risk...

External risk factors:

- exposure to sports activity
- type, intensity, quantity and frequency of training
- environmental factors - climatic conditions, types of surfaces and equipment

A quality assessment that you can use to screen individuals before training (and modify for your own needs) (Cressey, E. 2008) - FUNCTIONAL APPROACH "BE HEALTHY"

Functional training (Charles DeFrancesco, 2009) - is defined as movements or exercises that improve a person's ability to complete their daily activities or to achieve a specific goal

BASIC EXERCISES - squat, Push-Ups, Pulling Exercises

ATHLETICS SKILLS - result and knowledge of performance in long jump, sprint, shot put etc..

Quality and quantity of performance

Quality measures - performance of results (how many pounds – squat...)

Qualitative measures - that focus on the form or technique of movement - **knowledge performance**

Principles of functional training (Marković, G. 2014)

Mobility of joint and soft tissue flexibility

Centered POSITION of joints and spine
Proper breathing pattern
Good kinesthesia and proprioception
Integration of the above principles in the form of movement (motor program)

2. WHAT'S MOBILITY?

Mobility of body - FREEDOM OF MOVEMENT

Passive - without the influence of gravity and voluntary muscle contractions

Active - active performance of movement

2.1. Basic exercises (tests) - mobility

Movements that provide the performance of basic functional tasks

Gray Cook: FMS & SFMA

Movement patterns can be:

Functional movement without pain

Dysfunctional movement without pain

Painful functional/dysfunctional movement - doctor

2.2. Basic tests – mobility

Cervical Pattern One – SFMA - Criterion - touch the sternum with chin

Cervical Pattern Two– SFMA - Criterion - face < 10° angle with imaginary horizontal line

Test - shoulder mobility - Criterion - Fists are within one hand length

ACTIVE STRAIGHT-LEG RAISE - Criterion - Vertical line of the malleolus resides between mid-thigh and ASIS (70°). The non-moving limb remains in neutral position.

Multi-Segmental Flexion - Criterion - touching the toes with hands (knees stretched)

Seated rotation - Criterion - > 45° bilateral

Prone Active Hip Rotation - Criterion - Internal rotation 30-40°;
Criterion - External rotation 40-45°

Half Kneeling Dorsiflexion - Criterion - > 10 cm

2.3 Factors that limit mobility

Some of the factors that may affect:

Length/Muscle tone – muscle imbalance

Extensiveness fascia and nerve structure

Arthrokinematics of joints – joint play

Strength of agonists – active movement

Length/Muscle tone – muscle imbalance

Tonic and Phasic Muscle Systems (Janda, 1987)..

Tonic Muscle Systems – are prone to tightness or shortness. The tonic system consists of the “flexors”, and is phylogenetically older and dominant.

Phasic Muscle Systems – are prone to weakness or inhibition. These muscles work eccentrically against the force of gravity (Umphred, 2001).

3. KINETIC CHAIN CHECKPOINTS

Movement assessments require observation of the kinetic chain (HMS).

The kinetic chain checkpoints refer to major joint regions of the body including the:

Foot and ankle

Knee

Lumbo-pelvic-hip complex (LPHC)

Shoulders and head/cervical spine (upper body)

3.1. Types of movement assessments

Movement assessments can be categorized into two types: transitional assessments and dynamic assessments (NASM, 2001).

Transitional movement assessments are assessments that involve movement without a change in one's base of support. This would include movements such as squatting, pressing, pushing, pulling, and balancing.

Dynamic movement assessments are assessments that involve movement with a change in one's base of support. This would include movements such as walking and jumping.

3.1.1. Transitional movement assessments

OVERHEAD SQUAT ASSESSMENT

PURPOSE - this is designed to assess dynamic flexibility, core strength, balance, and overall neuromuscular control. The overhead squat

assessment has also been shown to reflect lower extremity movement patterns during jump landing tasks (Buckley BD, 2007)

PROCEDURE

The individual stands with the feet shoulder-width apart and pointed straight ahead. The foot and ankle complex should be in a neutral position. It is suggested that the assessment is performed with the shoes off to better view the foot and ankle complex. Have individual raise his or her arms overhead, with elbows fully extended. The upper arm should bisect the torso.

MOVEMENT

Instruct the individual to squat to roughly the height of a chair seat and return to the starting position. Repeat the movement for 5 repetitions, observing from each position (anterior, lateral, and posterior).

The kinetic chain checkpoints

OVERHEAD SQUAT ASSESSMENT - Anterior View

View feet, ankles, and knees from the front. The feet should remain straight with the knees tracking in line with the foot (second and third toes).

OVERHEAD SQUAT ASSESSMENT - Lateral View

View the LPHC, shoulder, and cervical complex from the side. The tibia should remain in line with the torso while the arms also stay in line with the torso.

OVERHEAD SQUAT ASSESSMENT - Posterior View

View the foot and ankle complex and the LPHC from behind. The foot and ankle complex will demonstrate slight pronation, but the arch of the foot will remain visible. The feet should also remain straight while the heels stay in contact with the ground. The LPHC should not shift from side to side.

Techniques for development of mobility - Overactive Muscles

The problem of the soft tissue

Static isolated stretching - at the end of training 1-3 min x 2-3 series (deep and calm breathing)

Dynamic integral stretching - at the beginning of the training 5-10 repeat x 2-3 series

Joga - integral movements

PNF stretching techniques – contract-relax...5-6 second contraction – 20-30 seconde relaxation

Special manual techniques

Self-Myofascial Release – power stick, foam roller, balls ...

Self-miofascial release with FOAM ROLLER. - Rolling soft tissue – 20 sec by segment. Pressure myofascial tissue with ball/foam roller + movement performance (10-15 rep)



Health and injury prevention in young athletes

dr.med. Mirjana Bezdrov, dr.med. Merim Bezdrov, Leo Bezdrov

1. INTRODUCTION

Occupational health and injury prevention is by no means a simple process. It is a set of measures that seek to preserve the health of an athlete which is very difficult nowadays due to the fact that the physical demands on the athlete's body greatly exceed the physiological capacity of the human body.

Prevention of sports injuries and damages must be carried out on several levels:

The level of primary prevention - focused on healthy people, involves removing the risks and causes of diseases and improvement of general health in order to prevent the onset of a disease.

Prevention of sport injuries and damage can be carried out by a doctor of sports medicine or a doctor of general medicine. One of the measures of primary prevention is not allowing the athlete whose health is endangered by sports to continue with sport activities. The ones who participate in primary prevention with equal importance alongside doctors are sports coaches. They should, with the help of a doctor, make the training process such that, with the maximum preparation for achieving top results, the health of the athlete is preserved as much as possible with an emphasis on preventing possible injury or damage.

Every coach should have basic knowledge of sports injuries and their pathogeneses. Trainers and doctors should work toward transferring this knowledge to athletes.

Only by having all the participants involved in sport (athlete, parent, coach and doctor) is it possible to implement effective primary prevention of sport injuries and damage, thus preserving the health of the athlete.

The level of secondary prevention - involves recognizing the earliest signs of damage to the musculoskeletal system or overtraining as well as stopping the disease from progressing with a timely intervention. This is very difficult as it requires teamwork and calls for each team member (athlete, parent, coach and doctor) to take responsibility for their actions. The athlete must be responsible and tell the truth about his/her health.

A big problem may be hiding symptoms in order to continue with sport activities at all costs. Parents must be active and cooperate with the doctor and the coach. In the occurrence of pain, the coach must immediately inform the doctor and take all necessary precautions within his domain in order to stop the injury from progressing and happening again (reducing training intensity, working on warming-up before doing sport and relaxing after sport activities).

The level of tertiary prevention - undergoing optimal treatment (domain of doctors).

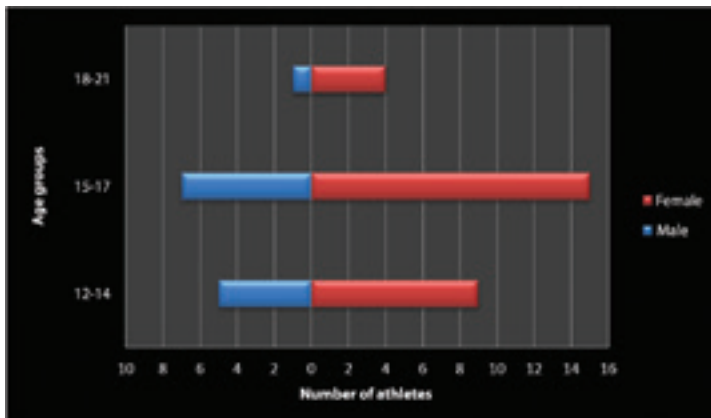
2. METHODS

A review done by taking general data (age, gender, sport discipline, anamnesis - information about previous illnesses and injuries), filling out a questionnaire, taking anthropometric measurements (height, weight, BMI, body fat percentage, blood pressure and pulse) and performing function tests (spirometry, ECG, ultrasound examination of the shoulder, knee and ankle joints). The tests were performed in cooperation with the Polyclinic for Occupational Health and Sport and Physical Medicine and Rehabilitation Diomed Larem.

3. RESULTS

The first testing round included 69 applicants while the second testing round counted 41 out of the 69 original participants. The results were gathered and we only analyzed the results of those who had participated in both testing rounds.

Applicants who participated in both testing rounds have been categorized by age and gender.



Graph 1.1 - Dispositions of the applicants' age and gender

Fundamental physical characteristics of the applicants were established by basic anthropometric measurements.

Table 1.1 - anthropometric parameters of weight, height and BMI recorded in females

Age group	Weight(kg)	Height(cm)	BMI
12-14	50 (S.D.-2.3)	164 (S.D.-1.3)	19.5 (S.D.-1.5)
15-17	57 (S.D.-3.1)	169 (S.D.-1.8)	19.7 (S.D.-2.1)
18-21	63 (S.D.-1.6)	170 (S.D.-1.9)	21.7 (S.D.-1.6)

Table 1.2 - anthropometric parameters of weight, height and BMI recorded in males

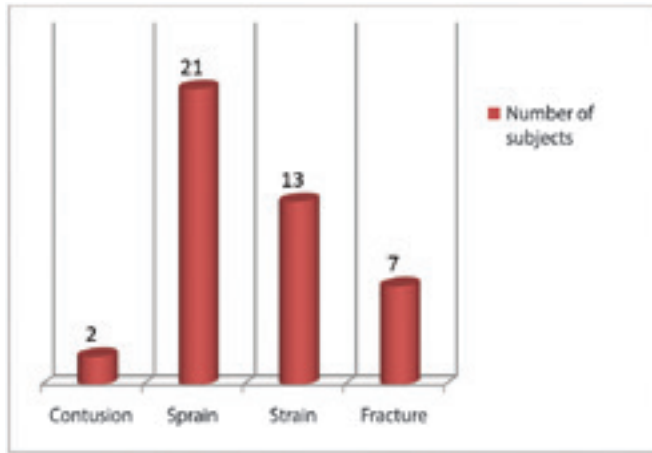
Age group	Weight(kg)	Height(cm)	BMI
12-14	66 (S.D.-0.9)	174 (S.D.-1.1)	21.4 (S.D.-1.0)
15-17	64 (S.D.-1.4)	177 (S.D.-1.5)	20.5 (S.D.-1.4)
18-21	71	173	23.7

Examining the body fat percentage results, only one case of a dangerously low percentage of body fat (4.6%) was found.

In the body composition of athletes it is generally desirable to have as much non-fat tissue as possible, but it should be noted that a very dangerous situation arises when the body has too little fat. This is especially important for female athletes because the secretion of female sex hormone estrogen depends on the amount of body fat. It is not good for female athletes to have their amount of body fat fall below 10%, and in male athletes the threshold is 4%. Although variations in blood pressure are uncommonly found, their importance lies in the fact that they are frequent indicators of heart or kidney malfunction.

Only one case of arterial blood pressure results deviated from reference values. The supervising coach has been notified and we recommended further testing.

The questionnaire revealed high incidence of injuries associated with training, as was expected.



Graph 2.1 - Types of recorded injuries

By the place of origin sports injuries can be categorized as: injuries of the joints, muscles or tendons, skin wounds and subcutaneous tissue wounds.

They are often not isolated but rather associated. The sport injuries data showed the most common joint injuries: spraining of the ankle (14), the knee (6) and the shoulder (1). Strained dorsal muscles (5), muscles of the groins (5) and muscles of the upper leg (3) were also reported. Fractures of the forearm (6) and the lower leg (1) were also reported as sports injuries.

* (n) -> n is the number of applicants with reported injuries

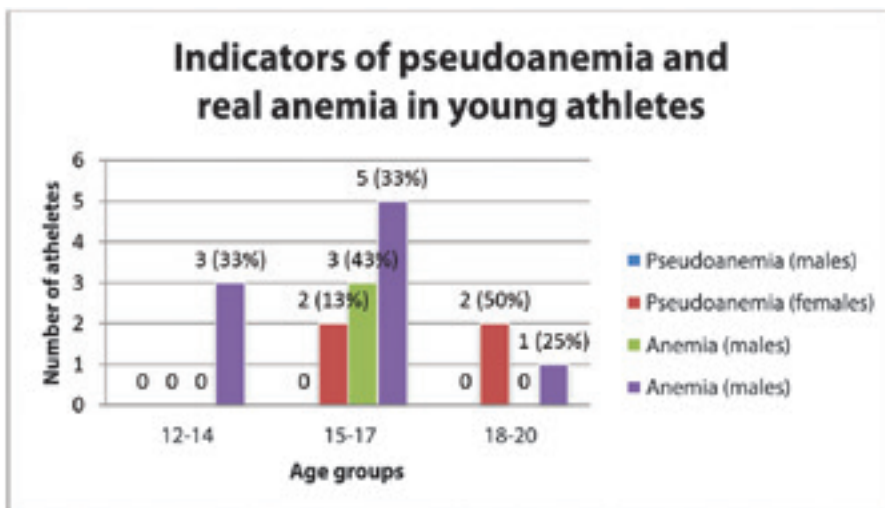
Spirometry is a non-invasive method used to measure lung capacity and the flow of air through the airways. The test is performed by taking a deep breath followed by continued strong exhalation. We observed these parameters: forced vital capacity (FVC), forced expiratory volume in one second (FEV1), parts of the curve flow volume (PEF, MEF 50, 75, 25) and maximum voluntary ventilation (MVV).

A 20% deviation from reference values was considered as impairment. Data analysis of the results gathered during both testing rounds showed no significant impairments.

Laboratory analysis of a blood sample taken from the fingertip (on an empty stomach) was used to observe blood glucose (a biochemical parameter) and hematological parameters: RBC, MCV, HCT, MCH, MCHC, RDWR, HGB and DBC (differential blood count).

Changes that indicate the presence of anemia and pseudoanemia were found. Pseudoanemia is a phenomenon that occurs as a result of a blood plasma volume increase in the body as it adapts to the increased need for oxygen during physical exertion. It is characterized by a reduced hematocrit (HCT) level, normal red blood cell volume (MCV) and normal to slightly decreased levels of hemoglobin (HGB). Unlike true anemia, there is no functional impact on performance and it does not require treatment.

Detection and monitoring of parameters that can be indicative of anemia is essential for determining how well the athlete endures sport activities. Monitoring anemia indicators in female athletes is particularly important because of the usual physiological processes that occur in the bodies of female athletes (intensive growth, enhanced muscle exercise which leads to an additional increase in muscle mass, loss of iron in the blood as a result of menstrual bleeding).



Graph 3.1 - indicators of pseudoanemia and true anemia in young athletes

Other blood disorders were not found.

ELECTROCARDIOGRAPHY (ECG) - (12 Channel) is a non-invasive method used to measure heart rate, its size and conductivity of the heart muscle. Analysing the ECG results the following changes were found: sinus bradycardia (25), first degree atrioventricular (AV) block (1), incomplete right branch block (5) and elevated T-waves (10). Disorders of the electrical function of the heart that we found are not characteristic of pathological

processes but rather attributed to a well-trained athlete and correspond to the changes documented in scientific literature. Pathological changes of the cardiopulmonary system have a high probability to result in severe, potentially fatal, consequences for the athlete when exposed to great physical efforts. These changes can be detected by spirometry and ECG which makes these tests extremely important for injury prevention in athletes.

It is essential to perform those tests before exposure to training loads and repeat them at least once a year.

* (N) -> N is the number of applicants with recorded changes

ULTRASOUND is an advanced, accurate, non-invasive diagnostic method that doesn't utilize radiation. It uses high-frequency sound waves to create images of the observed tissues and is extremely useful in quickly and accurately diagnosing muscle, tendon or joint injuries. Along with clinical examination, it should be the method of choice for diagnosing soft tissue injuries in sport. We performed ultrasound examinations of the shoulder, knee and ankle joints. Data analysis showed the following injuries: bursitis (Achilles tendon in 64% of cases), tendonitis (tendon supraspinatus in 6 cases), one case of a partially ruptured Achilles tendon and one case of a ruptured supraspinatus tendon.

By discovering the soft tissue damage during its genesis, we have taken the first step toward preventing serious injury of the musculoskeletal system.

The coaches of the applicants whose results pointed to such damage were informed and the importance of warm-up before every sport activity and relaxation afterwards was highlighted to them.

3. CONCLUSION

Data analysis of the medical part of the project HIP Ya! confirmed the need for cooperation between athletes, coaches and doctors in order to prevent injury and preserve health. Results that differ from the reference values for young athletes have been presented to the supervising trainers in the form of written and oral reports. The value of continuous monitoring of the parameters that give us an insight into the health of athletes has been noted. Based on our tests with respect to the objectives, we can conclude:

I. Significant discrepancies amongst anthropometric indicators were not found.

II. Spirometric parameters were within normal range.

III. Anemia is, as expected, significantly more frequent in female subjects while cases of pseudoanemia were not found at all.

IV. Blood glucose results do not diverge from the reference values.

V. Changes found on the ECG results are not pathological and are in line with expectations.

VI. As evident from the ultrasound results, the most common finding is bursitis, tendinitis then sporadic ruptured Achilles tendons and rupture of the supraspinatus tendon.

The Project's program has provided an excellent opportunity to clinically investigate the physical changes as a result of new training methods and an opportunity to connect medicine with sport. It is generally considered that engaging in sport activities at a young age is healthy and that it has a positive effect on the growth and development of young people, both physically and mentally. But the crucial bit is the way we go about doing sport.

If one doesn't approach training properly, the consequences can be severe.

An athlete's regard to sport has a number of factors. The most important one is that the athlete, especially when it comes to a young person, has a responsible coach who will direct and guide him/her through the training process. This includes everything from training methods, establishing current physical limitations to taking care of the athlete's health. Of course, the athlete himself/herself, like all people, must take responsibility when it comes to their own health. Health is best preserved by following the good old policy of "better safe than sorry". To prevent injuries as efficiently as possible, communication is of utmost importance. The athlete should report any suspicious changes and / or pain to the coach, and if the coach deems it necessary, the problem should be reported to a doctor. The doctor may then provide optimum health care in terms of diagnostics, treatment and prevention of future injuries.

LITERATURE:

Daraboš N. Kako pobijediti športsku ozljedu. Medicinska naklada, Zagreb, 2011.

Mišigoj-Duraković M. i sur. Tjelesno vježbanje i zdravlje. Grafos, Zagreb, 1999.

Pećina M. i sur. Športska medicina. Medicinska naklada, Zagreb, 2003.

Pećina M., Bojanić I. Overuse Injuries of the Musculoskeletal System, Second Edition, CRC Press, Boca Raton (FL), 2003.

Guyton CA, Hall EJ. Medicinska fiziologija. Medicinska naklada, Zagreb, 2006.

Malczewska J., Raczynski G., Stupnicki R. Iron status in female endurance athletes and in non-athletes. Int. J. Sport Nutr. Exerc. Metab. 10:260-270, 2000.

Wilmore, J.H., Costill, D.L. (1999). Physiology of sport and exercise. Champaign, Ill.: Human Kinetics.

Medved R. Sportska medicina. Zagreb: JUMENA; 1987.



Authors

FRANE ŽUVELA, Phd.

Born on 12 May, 1978 in Split. Married, father of two children.

2001 - graduated at the Faculty of Science and Education in Split (now Faculty of Kinesiology University of Split).

2005 - defended his master's thesis entitled "Morphological and motor features seven-year boy involved in the 9 month program of additional athletic training" at the Faculty of Kinesiology, University of Zagreb.

2009 - defended his doctoral thesis entitled "Design and validation of measuring instrument for assessing biotic motor skills" at the Faculty of Kinesiology University of Split.

During the entire study had university, then a state scholarship.

2002 - employed as assistant at the Faculty of Natural Sciences, Mathematics and Kinesiology, Department of Kinesiology (now Faculty of Kinesiology, University of Split).

2002 to 2007 - worked as a research assistant in the project "Establishment of anthropological models in sport," lead researcher. Ratko Katić, PhD.

2008 to 2010 - worked as a research assistant on a scientific project "Measuring movement skills in kinesiology," lead researcher Đurđica Miletić, PhD.

He is currently employed at the Faculty of Kinesiology, University of Split as Assistant Professor (athletics – all disciplines and physical conditioning in soccer, tennis and volleyball).

Mentor of one doctoral dissertation, and 15 graduate and master's theses.

A teacher at the postgraduate studies, graduate studies and undergraduate professional studies in kinesiology at the Faculty of Kinesiology University of Split.

Currently, Head of Professional studies at the Faculty of Kinesiology.

Published 31 research papers in various journals and publications. So far, he has been cited 31 times according to citation database Scopus, or 24 times according citation database WOS in domestic and foreign CC and SCI journals.

