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D2.2 Beta-version Curriculum and Beta-version of
Educational resources based on corrections

TeamGym4Health

Educational Methodology



The D2.2 Beta-version Curriculum and Beta-version of Educational Resources represent a refined and improved version of the initial D2.1, developed collaboratively with input from all project partners. This updated version incorporates several significant enhancements based on thorough discussions and feedback. Key improvements include additional video materials presented as QR codes linking to educational resources, corrections of editorial errors, and minor textual adjustments to improve clarity. Two new paragraphs - Identification of conditional characteristics and Motor tests have been added, along with two appendices: a detailed training session plan and a progress tracking sheet. Furthermore, the updated curriculum now features the project website address, providing easier access to resources and updates, thereby ensuring greater utility and accessibility for stakeholders.

ERASMUS-SPORT-2023

Topic: **ERASMUS-SPORT-2023-SCP**

Proposal acronym: **TeamGym4Health**

List of participating organisations

1.	SPORTNO DRUSTVO GIB LJUBLJANA SSKA	Slovenia	Coordinator
2.	FACULTY OF SPORT AND PHYSICAL EDUCATION	Serbia	Partner
3.	GINASIO CLUBE PORTUGUES	Portugal	Partner
4.	ARTISTIC GYMNASTICS CLUB "TRESNJEVKA"	Croatia	Partner
5.	BOLU PROVINCIAL DIRECTORATE OF YOUTH AND SPORTS	Türkiye	Partner
6.	DIRECTORATE OF RIJEKA YOUTH AND SCHOOL SPORTS	Croatia	Partner
7.	SMART NEST	Latvia	Partner

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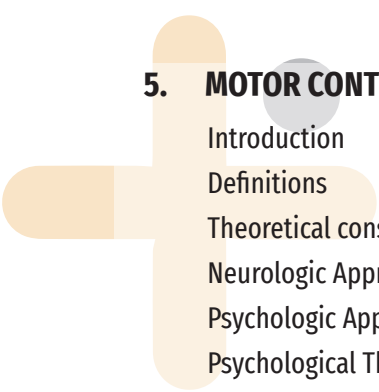
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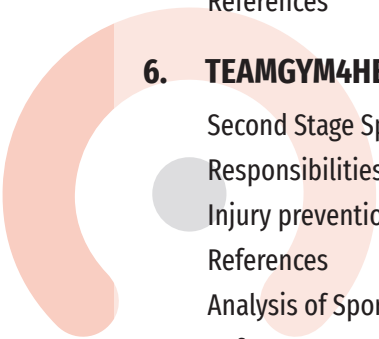
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INTRODUCTIONS

This education material was a result from the project goal for new gymnastics disciplines TeamGym, to present methodology and curriculum development for trainers. The final outcome of this project predicts approach of new discipline thry instructional manual. The project main goal has their own mission:

- TeamGym4Health (TG4H) is a collaborative partnership that aims to improve child and youth health through the practice of new Gymnastics for All discipline called TeamGym;
- Development of the TeamGym4Health Educational Methodology (TG4HEM) for coaches;
- Provide the TeamGym4Health TG4HEM to coaches;
- Pilot TeamGym4Health training program for youngsters.

Specific project goal is to the develop an educational manual with app and a MOOC about how to implement TG4HEM for coaches.

TeamGym is an extremely popular sport in the northern Europe, but poorly spread elsewhere. TeamGym discipline was developed from Gymnastics for All and it is a team sports for all ages, levels and abilities as it promotes the values associated to the sports for all approach. Teams can perform as men's teams, women's teams and as mixed teams in three apparatus: floor, tumble and trampette. With the help of organizations with good expertise in TeamGym and especially in using TeamGym in a healthy - enhancing physical activity approach, this project seeks to educate trainers in all partner countries and present this young sport discipline to the grassroots sport organisations, children, youth and their parents. These programs will improve children motor literacy, health and physical fitness. Once the consortium includes certified trainers, it will implement sport programs for children and youth encouraging them to participate in sport and getting its health benefits. Benefits of the

TeamGym4Health Educational Methodology

TeamGym discipline can be considered through team sport although gymnastic sports are mostly individual competitive disciplines. These discipline strongly develop common goal, friendship and caring for other teammates. Project General objective is to promote healthy lifestyles in children and youth through the practice of discipline called TeamGym (TG). Intension is to encourage participation of young athletes in new discipline. The education programme will be available to trainers, coaches and athletes who want to expand the knowledge in sport and learn how to implement it with different target - audiences, ages and conditions having always in mind. Discipline TeamGym should raise skills and competences of participant's healthy lifestyle and to promote coaches education through additional teaching model. This model of the new competition is adapted to the participation of all age groups and categories and this program is acceptable for persons with disabilities. Children and youth are active in health through practice of TeamGym.

Our focus is to enhance - health, sport participant and decrease sport dropout among young athletes. By educating coaches about training with TeamGym4Health program and skills development, we can offer new sport programs for young sport participants. TeamGym4Health is fun, energetic way of gymnastics, where athletes train in teams, encouraging each other. With our project we will educate coaches about Team Gym methods with focus on safety of the athletes. We will also focus on prevention against violence and abuse in sports into the Educational program for trainers. Once grassroots sports organisations have skilled coaches, they can implement safe sport programs for sport and physical activity and increase participation in recreational and competitive programs. This project offers Teamgym trainer basic and advanced level programs which are different from the individual gymnastics program. These team programs can be interesting for new participants in developing friendship, learning new sports movements through fun and developing healthy lifestyle habits.

TG discipline through history

TeamGym was created by the European Union of Gymnastics and it is a form of competitive team sport. The first official competition was held in Greece in 1995. Originally these discipline was caled EuroTeam. Team of our Slovenian

project partner participated in Greece and they took 3th place in mix groupe. Current name TeamGym received in 2002. From 1996 to 2008, the European Championships was an event for clubs; since 2010, the competition is contested with national teams representing different countries. The first official TeamGym European Championships was held in Sweden in 2010, which included junior and senior teams. TeamGym competition consist of three sections: women, men and mixed teams. Gymnasts perform skills in three different disciplines: floor, tumbling and trampette. In common for the performance is effective teamwork, good technique in the elements and spectacular acrobatic skills. In United States these sport discipline is governed by USA Gymnastics under the Gymnastics for All (GfA) discipline.

TG competition program

The European Championships in TeamGym is one of the youngest **European Gymnastics** event. TeamGym is a team competition performing in three disciplines: Floor, Tumble and Trampet. All three disciplines require effective teamwork and excellent technique with difficult skills in acrobatic and gymnastic elements. TeamGym competitions are divided into three sections: Women, Men and Mixed teams. The event is attractive for spectators and media as well as sponsors because it's both entertaining and exciting to watch. At 2023, was the first Europeanchapionshep in TeamGym for clubs in Ligniano (Italy), and its going to be every two years. TeamGym competitions are recognized by their very good spirit and an exciting atmosphere.

A team may consist of 8 - 10 gymnasts, all of them must compete on floor. On tumble and trampet, 6 gymnasts perform in each round. In all disciplines, all the performing gymnasts are judged. A mixed team must consist of 50% male and 50% female gymnasts.

Facilities and requirements in TG

Requirements for competitive program includes varios skills in three discipline: Floor, Trampet (Trampette) and Tumbling.

Floor is discipline where all members of the Team take part in the program, composed of a mixture of dance, flexibility and skill. The routine has to be

TeamGym4Health Educational Methodology

skillfully choreographed and the judges look out for changes in shape. There needs to be at least one handstand, one standing balance, 3 jumps/leaps or hops, 2 acro elements, one group element and 1 flexibility element. These section elements are bodywaves for women's teams, power elements for men's teams and lifts for mixed teams. Floor routines are performed to music.

A Trampet is a small square trampoline used in gymnastics. In TeamGym, the trampet is positioned at the end of a 25-meter-runway in front of a mat. The trampet is adjusted at an angle, tilted towards the gymnast, who approaches the trampet at a run. The gymnast jumps onto the trampet and performs a somersault, landing on the mat. Part of the TeamGym trampet program is performed with a vaulting apparatus, which is positioned between the trampet and the mat. Trampet programs are performed to music. Each team completes three consecutive rounds. During each round, six gymnasts perform one skill each. At least one round is performed using the vaulting table. The first round is always the "team-round" where every gymnast competes the same skill. Each athlete closely follows the previous athlete without pause, making for a high-speed program. This is referred to as "streaming". At least two gymnasts have to be moving (usually one is running and the other one is about to take off from the trampet and perform an element) or else there will be a deduction of points made towards the team. Beginners usually start with simple jumps, such as the straight, tuck, star, straddle and pike jumps. Intermediate moves include tuck front, pike front, and straight front somersaults, while advanced moves include straight halves, straight fulls and doubles - with or without twists. Backward moves such as tuck backs or straight backs are not usually performed because the gymnast approaches the trampet at a forward run, making it difficult to land such moves.

Tumbling at the competition program have three runs (rounds) involved. One of which has to include all six gymnasts doing a forwards series. Second run gymnasts must perform backward serie. Another run also has to include the gymnasts completing the same move. Each series must have at least three different acrobatic elements.

Technical Regulations

Routines on each apparatus (Floor, Tumble and Trampet) require effective teamwork and excellent technique with difficult skills in acrobatic and gymnastics elements.

TeamGym competitions are divided into three sections: Women, Men and Mixed Teams. Mixt teams are consisting of both female and male gymnasts, whiles women teams consists only from female and Men teams only from male mambbers. The team may consist of 8-10 gymnasts. Each of them must compete on Floor, whiles only 6 gymnasts must take part in each round on Tumble and Trampet. Mixed Team must consist of 50% male and 50% of female gymnasts.

Floor routines are performed with instrumental music. All gymnasts perform the floor. Floor area 14 m x 16 m, and time limit: 2:15 min – 2:45 min. Tumble and Trampet must be perform to music. The time limit for both Tumble and Trampet is 2:45 min. The gymnasts participating in Tumble and Trampet must perform the Floor routine. Coach(es) are mandatory for security spotting. The gymnasts must show balance and control in landings, but are not required to stand perfectly still, because they are streaming the rounds.



https://backend.europeangymnastics.com/sites/default/files/paragraph/document/European%20Gymnastics%20-%20Introducing%20TeamGym%20July%2011%202023_updated2.pdf

Pic 1. Floor routine TeamGym

TeamGym4Health Educational Methodology

The **Tumble routine** consist of 3 rounds. 1 round must be forward, and 1 round must be backwards. Each round has different elements put together to form a round. Eg. Round off – Flick-Flack – Straight Backwards Salto. The first round is the same for all gymnasts – Team Round. Each round is performed by 6 gymnasts, and consist of minimum 3 elements at the highest level. The last element cannot be repeated in other rounds. For entry level competitions the requirements for number of gymnasts and elements could be different. Eg. 1 element and maybe all gymnasts. The apparatus for Tumble is a fiber track designed for TeamGym. This is used for European Championships and other high-level competitions. The track is 15 m long and 2 m wide, with a 16 m run-up.



<https://eurogym.dk/en/products/tumbling-tracks/>

Pic 2. Tumble track

The **Trampet routine** consists of 3 rounds. 1 round has to be with the Vaulting Table, and 1 round needs to be without the Vaulting Table. Is not allowed to repeat the same element in another round. The first round is the same for all gymnasts – Team Round. Each round is performed by 6 gymnasts. There are different requirement for twists, rotations and intensification. For lower level competitions the requirements for composition may be lower, and the difficulty values may be limited. The apparatus for Trampet is a high performance trampete designed for TeamGym, plus a Vaulting Table and appropriate landing mats and run-up. This is used for European Championships and other high-level competitions. For entry level competitions it is possible to use other alternatives, that can be perfectly fine for that level. Eg. just springboard, open ended trampette, and foam equipment in place of the Vaulting Table.



<https://eurogym.dk/en/product/flying-en/>



<https://eurogym.dk/en/product-category/trampolines/mini-trampolines/>

Pic 3. Pegaz vault and Trampet





4health
TeamGym

INTRODUCTIONS

TEAMGYM4HEALTH FOR COACHES

TEAMGYM4HEALTH – 1ST COACHES CAMP

TEAMGYM4HEALTH FOR COACHES

The aim of these project is to make TeamGym more visible by offering a methodology of coaching approach to this discipline, gathering information about its adaptability of „Trainer to trainer“ approach and coach-athlete relationship. In the period of duration of this project video material will be collected that will be valuable for trainers in further educational improvement. All the video materials that were made during the project activity will be posted on the website of the project partners with an analysis of the technique and methodology of learning basic and complex gymnastic elements. The final result of this project will be educated trainers who can enroll in studies with Syllabus for beginners and advanced TeamGym trainers according to the accredited Serbian partner system – Faculty of Sport and Physical Education at the University of Niš. The first educational camp of coaches was held in summer 2024. in Bolu (Turkey) - beginners TeamGym program. Our second educational camp is going to be held in spring of 2025. in Zagreb (Croatia) - advanced TeamGym program.

The content of the program that will be implemented at the camps during the project duration is as follows:

First Stage Coaches Course



1. Sport Technique: 35 hours

1. Warm up protocol;
2. Movement definitions techniques of basic elements on:
 - Floor,
 - Tumble and
 - Trampet.
3. Forms of assistance;
4. Basic strength and flexibility programm.

2. Team Gym Rules: 10 hours

1. Technical instruction - TG competition program;
2. Recognition of elements;
3. General rules for floor, tumble and trampet;
4. The content and structure of exercise on Floor;
5. Technical Regulations (competition format, competitors, composition, staring order, tiebreak rules).

3. Analysis of sports activities: 25

1. Technical evaluation of basic elements - video analyses.

4. Special Training Information: 10 hours

1. Unit training preparation (basic-mid level athletes);
2. Weekly training preparation;
3. Monthly plan preparation;
4. Annual plan preparation;

5. Prospective Directions For Examining Motor Control, Motor Skills And Motor Learning: 50 hours

Second Stage Coaches Cours

1. Sport Technique: 45 hours

- Techniques of complex gymnastics skills
- Forms of assistance
- General strength training
- General flexibility training
- Identification of conditional characteristics
- Motoric tests
- Training sessions Plan

2. Responsibilities for coaches: 10 hours

1. „Trainer to trainer“ approach
2. Coach-athlete relationship
3. Injury prevention

3. Analysis of sports activities: 15

1. Verbal and nonverbal massages
2. Video resource for coaching skills

4. Special Training Information: 20 hours

1. Unit training preparation (high level athletes)
2. Weekly training preparation
3. Monthly plan preparation
4. Annual plan preparation

TeamGym4Health Educational Methodology

Syllabus of 1st Stage and 2nd Stage of Training practice

1. Sport Technique 1st (ST1) + Analysis of sports activities1 (ASA1): 35+25 = 60 hours
 - Sport Technique 2nd (ST2) + Analysis of sports activities2 (ASA2): 45+15 = 60 hours
2. Theoretical methodology of sports training discipline:
 - Prospective Directions For Examining Motor Control, Motor Skills And Motor Learning (MSL): 50 hours
 - TeamGym Rules (TGR): 20 hours
 - Responsibilities for coaches (RC): 20 hours
3. Practice for Analysis of sports activities and Theoretical methodology of sports training discipline:
 - Special Training Information STI1 and STI2: 10+20 = 30 hours

Fig 1. Professional courses 240 hours

SPORT SPECIFIC SUBJECTS		Professional courses 240 hours		
		Theory	Practice	Total
1.	Analysis of sports activities	MSL 50	STI1 10	60
2.	Methodology of sports training discipline	TGR+RC 40	STI2 20	60
3.	Sports pedagogical practice	-	-	ST1+ASA1 60
4.	Training practice	-	-	ST2+ASA2 60



Accredited operational trainer program at the Faculty of Sports at the University of Nis



TEAMGYM4HEALTH FOR COACHES



1st STCOACHES CAMP

4health

TeamGym

SPECIAL TEAMGYM TRAINING

TEAMGYM4HEALTH – 1ST COACHES CAMP

1. Sport Technique: 35 hours

1. Warm-Up protocol:

At the competition or training the first order is the warm-up. Most gymnasts starts with a general warm-up period of 15 to 30 minutes. This is when the gymnasts should go through their typical warm-up routine, including locomotor and aerobic exercises (running, stretching, and basic skill rehearsals). Next is the timed warm-up period. This is when the gymnasts are able to warm up their competitive skills on the apparatus. Depending on the competition format, the gymnasts may warm up on all disciplines and then compete, or they may warm up on one discipline and then compete on that discipline.

One of the main purposes of a warm-up prior to training and competition is to maximize performance and prevent injuries (Chaouachi, et al., 2010; Fradkin, et al., 2010; O'Sullivan et al., 2009; Safran et al., 1989; Shellock & Prentice, 1985). Warm-up is typically composed of a submaximal aerobic activity, stretching of the major muscle groups, as well as general and sport specific exercises performed at or near competition intensities (Taylor et al., 2008). Low to moderate aerobic activity increases body and muscle temperature, muscle compliance and efficiency of physiological responses (Bishop, 2003). The combined effects of stretching and conditioning exercises during warm-up may be influenced by the flexibility and muscle power of the performer, as well as by the volume of exercise. Gymnastics is a sport that is generally characterized by high levels of strength and power relative to body weight, as well as high flexibility (Arkaev & Sutsilin, 2004). Athletes of the different

TeamGym4Health Educational Methodology

gymnastics disciplines are characterized by varying levels of flexibility and muscle power.

The final part of a typical warm-up involves general and sport specific explosive movements that may induce a phenomenon called post-activation potentiation (PAP), (Gelen, 2010; Hilficker et al., 2007). PAP is characterized by increased muscle force and power output in the next 4-20 minutes following voluntary conditioning contractions performed at high intensities (Tillin & Bishop, 2009). PAP is greater in individuals with high levels of muscle power, who also have a higher proportion of type II fibers (Hamada et al., 2000; Young et al., 1995) and shorter twitch contraction time (Vandenboom et al., 1995). The acute effects of stretching and potentiating exercises in warm-up routines are opposing, i.e. stretching exercises decrease and PAP exercises increase muscle power. However, there is limited information on the combined effects of stretching and PAP exercises during warm-up. These data suggest that there may be different responses to stretching and PAP protocols, depending on the training status, baseline flexibility and muscular power.

Donti et al, 2014. have shown that initial levels of flexibility and vertical jump ability have no effect on straight leg raise range of motion (ROM) and counter-movement jump performance (CMJ) of elite gymnasts following warm-up protocols differing in stretching and potentiating exercise volumes. Stretching of the main leg muscle groups for only 15 s has no effect on ROM of elite gymnasts. In these highly-trained athletes, one set of 5 tuck jumps during warm-up is not adequate to increase CMJ performance, while 3 sets of 5 tuck jumps result in a relatively large increase in CMJ performance (by 4.6% above baseline), despite a 5.9% increase in flexibility due to the 30 s stretching exercises.

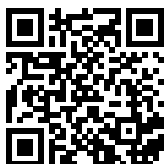
The warm-up in TeamGym when the team consists of 10 competitors warm-up should be specific and well organized, performed as a group with an established exercise routine and a team leader who will take care of the joint warm-up. TeamGym warm-up should consist of brief aerobic activity (e.g., running), stretches that focus on range of motion, and a few brief drills related to skill rehearsals.

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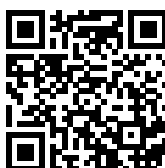
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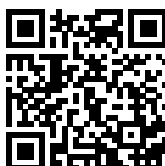
Floor Warm up 1



Floor Warm up 2



Running & Athletic Drills



Gymnastics Movements

2. Movement definitions techniques of basic elements on:

Basic Teamgym Floor Discipline – non gymnast (from 12-15 years old)

This curriculum was designed to help non gymnasts for all ages, levels and abilities to develop fundamental movement skills which was the topic of these project, and also to help coaches to start preparing gymnasts for TeamGym competition.

Introduction and Objectives

- **Objective:** Develop harmony, synchronization, basic technical knowledge, flexibility, teamwork, and unity in the Floor discipline.
- **Key Components:** Rhythmic and choreographic elements performed to music, requiring all team members to perform together.

Warm-Up Strategies

Warm-ups should be done to music to enhance rhythm and coordination.

• Warm-Up Activities:

1. **Running & Athletic Drills:** Running the length of the floor, diagonally crossing with stabilization exercises.
2. **Gymnastics Movements:** Walking on all fours, hopping on one leg, double leg jumps combined with stabilization exercises.

3. **Running in Circles:** Side jumps, hops, lateral movements, backward movements, combined with stabilization exercises.
4. **Dynamic Stretching:** Running with stretching in easy basic formations such as circle, 2 lines, diagonal,... , counting together (e.g., 8 seconds per stretch).



Running in Circles

These activities aim to improve coordination with music, teamwork, synchronized steps, spatial awareness, and flexibility.

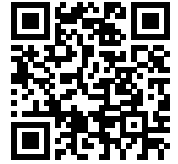
Key Skills and Techniques

1. Handstands

Importance: Fundamental skill worth 1.0T in routines.

Progression Drills:

- Standing on all four, one leg is positioned up while we do jumps with another (take turns with legs).
- Headstand (by the wall, with help, on the floor).
- Handstand up against the wall (both sides).
- Assisted handstand with a partner.



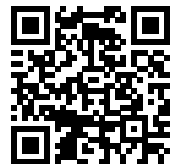
Handstands

2. Standing Balance (One-Legged Stance)

Focus: Consistency in arm and leg positions.

Progression Drills

- Holding position with support (beam, ballet barre, wall bars, mirror).
- Holding position without support.
- Individual execution for at least 5 seconds.
- Execution with counting (position, hold, final stance).
- Rise and hold with support.



One - Legged Stance

3. Pirouettes and Power Balance

- Holding position with support.
- Turning with support.
- 180° and 360° turns with plié.
- Inward turns.
- Turns with leg in the bent position on the knee.



Pirouettes and
Power Ballance

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4. Rhythmic Jumps



Leg swings (forward, side, back)

Types of Jumps:

1. **High-Far Jump:**
 - Leg swings (forward, side, back).
 - Hopping from one leg to another.
 - Jumping over mats.
 - Assisted jump (beam, ballet barre, mats).
2. **Scissor or Cat Leap:**
 - Scissors in running.
 - Leg raise and switching legs mid-air.
 - Assisted jump.
 - Jump with springboard.
 - Independent jump execution.
3. **Extended or Tucked Jump:**
 - Extended jumps with whole team (on counting)
 - Tucked jumps with the whole team (on counting)
 - Extended jumps with whole team (same position of hands – position, hold, final stance)
 - Tucked jumps with the whole team (same position of hands – position, hold, final stance)

5. Acrobatic Elements

Elements Required: Two different acrobatic elements not from the same row in COP.

1. **Backward Elements:** Roundoff, rollover back to handstand, walkover bkw
2. **Forward Elements:** Handspring and walkover frw



Group element

Team Coordination and Group Elements

- **Group Elements:**
 1. Partner, trio, and team lifts.
 2. Building confidence, trust, and teamwork through cooperative exercises.

6. Choreographic Elements

| Choreography Development

1. **Ballet Drills:**
 - At the barre and on the floor without music.
 - With music to improve rhythm and flow.
2. **Rhythmic Jumps and Acrobatic Elements:**
 - Executed with counting (in pairs, trios, team).
 - Executed with music (in pairs, trios, team).
3. **Formation Changes:**
 - Lateral movement: side jumps, running, cross steps, basic dance steps.
 - Formation transitions: changing positions from one formation to another upon signal (initially walking, then running, jumping, and basic dance movements).
4. **Choreography Construction:**
 - Assemble routines integrating all elements: rhythmic jumps, acrobatics, and group coordination.

Final Notes

- **Consistency:** Regularly update the module based on feedback and new techniques.
- **Engagement:** Keep sessions engaging to maintain motivation.
- **Professional Development:** Stay updated with the latest coaching techniques and safety protocols.



| Preparing
choreography

TeamGym4Health Educational Methodology

Basic Teamgym Trampet Discipline – non gymnast (from 12-15 years old)

This curriculum for Trampet was designed to help non gymnasts for all ages, levels and abilities to develop fundamental skills and also to help coaches to start prepare for TeamGym competition.

WARM-UP ACTIVITIES

1. Dynamic Stretching

A. Arm Circles

- 30 Seconds: Open your arms to the sides and make small circles.
- 30 Seconds: Continue by making larger circles.

B. Knee to Elbow Touches

- Lift your knees to your opposite elbow and touch.
- Alternate both sides.

C. Leg Swings

- 30 Seconds: Swing one leg forward and backward.
- 30 Seconds: Swing the other leg.

D. Side Lunges

- Widen your legs and lean to the right and left.
- Stretch your legs by leaning equally to both sides.

E. Hip Opener

- Lift your knees and rotate them outward.
- Alternate both legs.

2. Cardio Drills

A. Light Jog

- Jog lightly in place.
- Lift your knees slightly.

B. High Knees

- Jog in place by pulling your knees to your chest one by one.
- Try to pull each knee as high as possible.

C. Butt Kicks

- Try to touch your heels to your buttocks while jogging in place.
- Move your legs quickly and controlled.

D. Side Steps

- Move side to side by stepping sideways.
- Gradually increase your speed.

E. Jumping Jacks

- Jump by opening your feet and raising your arms.
- Move your arms and legs simultaneously.

3. Strength and Mobility Drills

A. Squat

- Squat and rise by opening your feet shoulder-width apart.
- Perform the movement slowly and controlled.

B. Plank

- Hold a push-up position and tighten your abs.
- Hold the plank position for 30 seconds and rest for 30 seconds.

C. Mountain Climbers

- Pull your knees to your chest in a plank position.
- Move quickly and rhythmically.

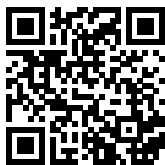
D. Forward Lunges

- Step forward and squat, then return to the starting position.
- Alternate both legs.

E. Toe Touches

- Stand and lift one leg and touch your toe with your hand.
- Alternate both legs.

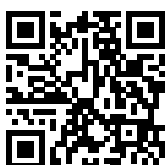
TeamGym4Health Educational Methodology



Stretch jump on mini trampoline



Straddle pike jumps



Stretch jumps on long trampoline



Straight salto fw on mat on long trampoline



Salto straight on mat with half turn

SPORT-SPECIFIC WARM-UP EXERCISES

- Sprint runs on the carpet
- Run and single jump through the mat
- Run and tuck position jumping through the mat
- Run and pike position jumping through the mat
- Run and straddle jump (V) position jumping through the mat
- Run and half twisting jumping through the mat

MAIN EXERCISES

- Step on the trampet from the platform and perform a straight jump with arms up and tight.
- Step on the trampet from the platform and perform a handstand on the high mat.
- Step on the trampet from the platform, perform a handstand, and then fall on your back.
- Step on the trampet from the platform and perform a forward roll on the high mat.
- Step on the trampet from the platform and perform a forward somersault with the help of the coach.
- Learn different positions of the somersault (tuck, pike, straight).
- After learning all somersault variations, perform twisting somersaults (half, full, one and a half) step by step.
- For a half-twisting somersault, after landing the somersault on the mat, perform a jump and a half-twist step by step.
- At the end of this phase, the athlete is assisted by the coach to perform a half-twist during the landing phase of the somersault.
- This step-by-step process can be applied to all somersault positions.
- The reason for performing from the platform is that young children do not yet have the ability to jump after running.
- It is also important as a preliminary step for learning movements that will continue with running later on.
- After completing all this taxonomic development, athletes can progress from the assisted phase during the landing phase controlled by the coach to the phase where they can perform skills independently.
- Thus, athletes can perform their skills without needing assistance.

Basic Teamgym Vault Discipline – non gymnast (from 12-15 years old)

This curriculum was designed to help athletes for all ages, levels and abilities to develop fundamental skills on the Vault table while also boosting their confidence, and to help coaches to start to prepare gymnasts for TeamGym competition.



Tuck salto fw with
half turn

1. Introduction and Basic Information

- **Objective:** To teach athletes the basic techniques on the vault table and safely develop fundamental skills.
- **Aim:** Should include body awareness, coordination, flexibility, and basic strength training.



Tuck salto fw

Week 1-2: Basic Awareness and Preparation

- **Warm-up:**
 - General body warm-up (10 minutes): Repeating the warm-up exercises mentioned before light running and jumps.
 - Dynamic stretching (5 minutes): Focus on legs, elbows, wrists, shoulders, and lower back.
- **Basic Body Positions:**
 - Standing posture (salto position).
 - Arm and leg coordination exercises.

Introduction to the Vault Table:

- Safe approach to the vault and retreat exercises.
- Balance and controlled landing exercises on the springboard.
- Performing handstands on the vault table with preliminary exercises on the floor.
- Performing cartwheel exercises on the vault table with preliminary steps on the floor.

Week 3-4: Basic Techniques

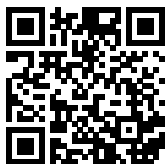
- **Warm-up:**
 - Cardio exercises (10 minutes).

TeamGym4Health Educational Methodology

- Static and dynamic stretching (5 minutes): Focus on spine, shoulders, wrists, and legs.
- **Vault Preparations:**
 - Basic jumps from the trampet (jumping onto the vault with the feet).
 - Landing from the vault.
 - Correct use of knees and pointed feet and maintaining body position in the air.
 - Repeated handstand exercises on the vault table.
- **Basic Vault Movements:**
 - Basic jumps from the springboard and placing hands on the vault for Tsukahara and handspring movements.
 - Reinforcement of Tsukahara and Handspring movements on the floor.
 - Straight landing exercises.
 - Stabilization exercises.

Week 5-6: Coordination and Strength

- **Warm-up:**
 - Speed training and interval runs (10 minutes).
 - Dynamic stretching (5 minutes): Focus on legs and torso.
- **Coordination Exercises:**
 - Fast running and jumping exercises.
 - Proper landing and push-off exercises.
- **Vault Table Exercises:**
 - Basic handspring techniques.
 - Correct landing position after the vault.
 - Landing from a handstand (preliminary step for handspring movement).
 - Circular movement steps for Tsukahara progression.
 - Back and front salto progressions from the vault.
 - Reinforcement of salto positions.
 - Tsukahara movement leading to a backfall onto the mat.



Jumps from mini
trampoline to Vault

- Backward roll into a salto as a preliminary step for the salto movement.

Week 7-8: Technique Development

- **Warm-up:**
 - Coordination exercises (5 minutes).
 - Flexibility exercises (10 minutes).
- **Strength and Explosiveness Exercises:**
 - Core and upper body strengthening.
 - Speed and explosive jump exercises.
- **Vault Application:**
 - Advancement of handspring movements.
 - Half-turn salto (landing on back) and full-turn landing on feet exercises.
 - Twisting salto progressions. Half-twist front salto and full-twist front salto.
 - Twisting back salto progressions. Half-twist back salto and full-twist back salto.



Explosive jump exercises

Week 9-10: Skill Reinforcement

- **Warm-up:**
 - Targeted warm-up and stretching (10 minutes).
- **Combination Exercises:**
 - Combining various vault and landing techniques.

Week 11-12: Performance and Evaluation

- **Warm-up:**
 - Light jogging and stretching exercises (10 minutes).
- **Performance Exercises:**
 - Execution of complete vault elements.
 - Control of consistent and accurate landings.
- **Evaluation:**
 - Technical proficiency assessment.
 - Feedback and forward-looking recommendations for each athlete's individual progress.

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- Extras
 - **Safety Precautions:** Proper form and techniques should be used in all exercises to minimize the risk of injury.
 - **Progress Tracking:** Each athlete's progress should be regularly recorded, and individual training sessions should be adjusted as needed.
 - **Psychological Preparation:** Mentorship and positive feedback should be provided to help athletes build confidence.

Final Notes for Project Teamgym Program

After first project camp in Bolu (Tyrkie) project partners had meeting and discussed about what kind of program should be offered that coaches can prepare gymnasts for Teamgym, which would be acceptable in partners Federation countries where that gymnastic discipline does not exist. Everyone agreed that the program should be simplified and adopted as **Program A** for non-gymnasts 12-15 years old, and **Program B** gymnasts 15-18 years old.

Project TeamGym Program A (non - gymnasts 12-15 years old)

LEVEL A-12 to 15 years old

General Rules

The target age group for this level is 12 to 15 years old, for both Male and Female gymnasts, with or without disabilities.

The technical difficulty defined for Level A is: Beginners Level

The teams for level A are composed of minimum 6 gymnasts and a maximum of 10 gymnasts.

Gymnasts can perform in Male, Female or Mix Teams. The composition of the Mix teams as to have a minimum of 40% - 60% gender representation.

The teams will present themselves on 3 different apparatus (routines): Floor; Tumbling and Mini-Trampoline (Trampet).

The rules for these teams' presentations are based on the Teamgym Code of Points, adapted to the Level of the performance required for Level A presentations on this Program.

APPARATUS: Floor

General Requirements

- The floor program is a routine for the whole team, performed with or without music (most appreciated).
- The limit for the floor program is from 50 to 90 seconds
- All gymnasts of the team must participate in the floor program
- The whole program must be performed in a marked area of (12mx12m)

Composition Requirements (2.0 points)

- Formations
 - 4 different formations (at least)
 - 1 Small Formation (4mx4m max.)
 - 1 Curve Formation
 - 1 Cross Formation
 - 1 Large Formation (1 m distance from all four corner of the marked area)

The composition score (C) score for each routine is calculated by taking deductions from 2.0 points. A deduction of 0.5 points for each requirement missing. The composition faults are explained in more detail in the Table of General Faults and Penalties.

Difficulty Requirements (Open Value)

- One (1) Balance Element
- One (1) Jump Element
- One (1) Acrobatic Element
- One (1) Group Element (4 persons involved min.)
- One (1) Flexibility Element

The difficulty score (D) score for each routine is calculated by adding the value of the elements. A deduction of 0.5 points on the final score, for each requirement missing. The composition faults are explained in more detail in the Table of General Faults and Penalties.

TeamGym4Health Educational Methodology

Execution Requirements (10.0 points)

The execution (E) score for each round is calculated by taking deductions from 10.0 points. The execution faults are explained in more detail in the Table of General Faults and Penalties.

APPARATUS: Tumbling

General Requirements

- Teams performs the tumbling rounds with 6 gymnasts minimum
- Mixed teams must have the same number of male and female gymnasts performing in each round
- Each team performs two different tumbling rounds, where each series must consist of a combination of at least two acrobatic elements without intermediate steps or series
- One round may consist of only 1 acrobatic element, if it is an acrobatic element with no hand supportive touch, (e.g. front somersault)
- The tumbling program is performed with or without music (most appreciated).
- The limit for the tumbling program is from 50 to 90 seconds
- All gymnasts of the team must participate in the floor program to perform on tumbling

The program must be performed according to the Tumbling Apparatus Rules defined in these Program

Composition Requirements (2.0 points)

- First Round: All gymnasts perform the same elements/ series (Team Round)
- Second Round: All gymnasts perform the same series or increase difficulty

The composition score (C) score - (C score) for each routine is calculated by taking deductions from 2.0 points. A deduction of 1.0 points for each requirement missing. The composition faults are explained in more detail in the Table of General Faults and Penalties.

Difficulty Requirements (Open Value)

- The choice of elements in the program should never sacrifice style and technical precision in favour of difficulty. The selected elements should always fit the knowledge and maturity of the gymnasts
- Teams perform the tumbling rounds with six gymnasts minimum

- In case the teams perform with more than six gymnasts, the difficulty is based on the elements performed by the last six gymnasts
- The difficulty value for all valid basic elements is found Table Tumbling Level A

The difficulty value for each round is calculated as the sum of the difficulty values for all gymnasts' individual routines

The difficulty score (D) score - (D score) for each routine is calculated by the averaged value of the two rounds and rounded down to the nearest 0.1 for the team's difficulty value

Execution Requirements (10.0 points)

The execution (E) score for each round is calculated by taking deductions from 10.0 points. The execution faults are explained in more detail in the Table of General Faults and Penalties.

APPARATUS: Mini-Trampoline (Trampet)

General Requirements

- Each team performs two different Mini-Trampoline (Trampet) rounds
- The Mini-Trampoline (Trampet) program is performed with or without music (most appreciated). The limit for the Mini-Trampoline (Trampet) program is from 50 to 90 seconds
- All gymnasts of the team must participate in the floor program to perform on Mini-Trampoline (Trampet)
- The program must be performed according to the Mini-Trampoline (Trampet) Apparatus Rules defined in these Program
- Composition Requirements (2.0 points)
- First Round: All gymnasts perform the same element (Team Round)
- Second Round: All gymnasts perform the element series or increase difficulty
- At least one round must be performed on the vaulting table
- At least one round must be performed without the vaulting table

The composition score (C) score - (C score) for each routine is calculated by taking deductions from 2.0 points. A deduction of 1.0 points for each requirement missing. The composition faults are explained in more detail in the Table of General Faults and Penalties.

TeamGym4Health Educational Methodology

Difficulty Requirements (Open Value)

- The choice of elements in the program should never sacrifice style and technical precision in favour of difficulty. The selected elements should always fit the knowledge and maturity of the gymnasts
- Teams perform Mini-Trampoline (Trampet) rounds with six gymnasts minimum
- In case the teams perform with more than six gymnasts, the difficulty is based on the elements performed by the last six gymnasts
- The difficulty value for all valid basic elements is found Table Mini-Trampoline (Trampet) Level A

The difficulty value for each round is calculated as the sum of the difficulty values for all gymnasts' individual routines

The difficulty score (D) score - (D score) for each routine is calculated by the averaged value of the two rounds and rounded down to the nearest 0.1 for the team's difficulty value

Execution Requirements (10.0 points)

The execution (E) score for each round is calculated by taking deductions from 10.0 points. The execution faults are explained in more detail in the Table of General Faults and Penalties.

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Tumbling - Table of Difficulty					
LEVEL A					
Diff Value	Group 1 Forward elements	K Code	Diff Value	Group 2 Backward elements	K Code
0.1	Roll tucked/piked	@	0.1	Roll tucked/piked	@
0.1	Handstand to roll	i	0.1	Roll tucked/piked to handstand	i
0.2	Cartwheel	X	0.1	Cartwheel	X
0.3	Round off	R	0.2	Round off	R
0.4	Handspring	H	0.3	Flick Flack	F
0.4	Flyspring	FS	0.4	Tucked salto	O
0.5	Tucked salto	O	0.5	Piked salto	<
0.6	Piked salto	>	0.6	Straight salto	/
0.7	Straight salto	\			

Mini-Trampoline (Trampet) - Table of Difficulty					
LEVEL A					
Diff Value	Group 1 With vaulting table	K Code	Diff Value	Group 2 Without vaulting table	K Code
0.1	Roll tucked/piked	@	0.1	Straight jump	I
0.2	Cartwheel (90°on/90°off)	X	0.1	Stradle jump	Y
0.3	Round off (90°on/90°off)	R	0.1	Pike jump	L
0.3	Handspring (with head support)	Hs	0.2	Tucked salto	O
0.4	Handspring	H	0.3	Piked salto	>
			0.4	Straight salto	\
			0.5	Tucked salto	O1
			0.6	Piked salto	>1
			0.6	Straight salto	\1

LEVEL B-15 to 18 years old

General Rules

The target age group for this level is 15 to 18 years old, for both Male and Female gymnasts, with or without disabilities.

The technical difficulty defined for Level B is: Intermediate Level

The teams for level B are composed of minimum 6 gymnasts and a maximum of 10 gymnasts.

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Gymnasts can perform in Male, Female or Mix Teams. The composition of the Mix teams as to have a minimum of 40% - 60% gender representation.

The teams will present themselves on 3 different apparatus (routines): Floor; Tumbling and Mini-Trampoline (Trampet).

The rules for these teams' presentations are based on the Teamgym Code of Points, adapted to the Level of the performance required for Level B presentations on this Program.

APPARATUS: Floor

General Requirements

- The floor program is a routine for the whole team, performed with music
- The limit for the floor program is from 70 to 120 seconds
- All gymnasts of the team must participate in the floor program
- The whole program must be performed in a marked area of (14mx14m)

Composition Requirements (2.0 points)

- Formations
 - 4 different Formations (at least)
 - 1 Small Formation (4mx4m max.)
 - 1 Curve Formation
 - 1 Cross Formation
 - 1 Large Formation (1 m distance from all four corner of the marked area)

The composition score (C) score for - (C score) for each routine is calculated by taking deductions from 2.0 points. A deduction of 0.5 points for each requirement missing. The composition faults are explained in more detail in the Table of General Faults and Penalties.

Difficulty Requirements (Open Value)

- Two (2) Balance Elements
- Two (2) Jump Elements
- Two (2) Acrobatic Elements
- One (1) Group Element
- One (1) Flexibility Element

The difficulty score (D) score - (D score) for each routine is calculated by adding the value of the elements. A deduction of 0.5 points on the final score, for each requirement missing. The composition faults are explained in more detail in the Table of General Faults and Penalties.

Execution Requirements (10.0 points)

The execution (E) score for each round is calculated by taking deductions from 10.0 points. The execution faults are explained in more detail in the Table of General Faults and Penalties.

APPARATUS: Tumbling

General Requirements

- Teams performs the tumbling rounds with 6 gymnasts minimum
- Mixed teams must have the same number of male and female gymnasts
- performing in each round
- Each team performs two different tumbling rounds, where each series must consist of a combination of at least two acrobatic elements without intermediate steps or series
- The tumbling program is performed with music
- The limit for the tumbling program is from 60 to 120 seconds
- All gymnasts of the team must participate in the floor program to perform on tumbling
- The program must be performed according to the Tumbling Apparatus Rules defined in these Program

Composition Requirements (2.0 points)

- First Round: All gymnasts perform the same elements/ series (Team Round)
- Second Round: All gymnasts perform the same series or increase difficulty
- The team must perform at least one round backwards (backward elements only) and one round forwards (forward elements only)

The composition score (C) score for each routine is calculated by taking deductions from 2.0 points. A deduction of 1.0 points for each requirement missing. The composition faults are explained in more detail in the Table of General Faults and Penalties.

TeamGym4Health Educational Methodology

Difficulty Requirements (Open Value)

- The choice of elements in the program should never sacrifice style and technical precision in favour of difficulty. The selected elements should always fit the knowledge and maturity of the gymnasts
- Teams perform the tumbling rounds with six gymnasts minimum
- In case the teams perform with more than six gymnasts, the difficulty is based on the elements performed by the last six gymnasts
- The difficulty value for all valid basic elements is found Table Tumbling Level B

The difficulty value for each round is calculated as the sum of the difficulty values for all gymnasts' individual routines

The difficulty score (D) score - (D score) for each routine is calculated by the averaged value of the two rounds and rounded down to the nearest 0.1 for the team's difficulty value

Execution Requirements (10.0 points)

The execution (E) score for each round is calculated by taking deductions from 10.0 points. The execution faults are explained in more detail in the Table of General Faults and Penalties.

APPARATUS: Mini-Trampoline (Trampet)

General Requirements

- Each team performs two different Mini-Trampoline (Trampet) rounds
- The Mini-Trampoline (Trampet) program is performed with or without music (most appreciated).
- The limit for the Mini-Trampoline (Trampet) program is from 60 to 120 secondsAU gymnasts of the team must participate in the floor program to perform on Mini-Trampoline (Trampet)
- The program must be performed accordingto the Mini-Trampoline (Trampet) Apparatus Rules defined in these Program
- Composition Requirements (2.0 points)
- First Round: All gymnasts perform the same element (Team Round)
- Second Round: All gymnasts perform the element series or increase difficulty
- At least one round must be performed on the vaulting table
- At least one round must be performed without the vaulting table

The composition score (C) score - (C score) for each routine is calculated by taking deductions from 2.0 points. A deduction of 1.0 points for each requirement missing. The composition faults are explained in more detail in the Table of General Faults and Penalties.

Difficulty Requirements (Open Value)

- The choice of elements in the program should never sacrifice style and technical precision in favour of difficulty. The selected elements should always fit the knowledge and maturity of the gymnasts
- Teams perform Mini-Trampoline (Trampet) rounds with six gymnasts minimum
- In case the teams perform with more than six gymnasts, the difficulty is based on the elements performed by the last six gymnasts
- The difficulty value for all valid basic elements is found Table Mini-Trampoline (Trampet) Level B
- The difficulty value for each round is calculated as the sum of the difficulty values for all gymnasts' individual routines

The difficulty score (D) score - (D score) for each routine is calculated by the averaged value of the two rounds and rounded down to the nearest 0.1 for the team's difficulty value

Execution Requirements (10.0 points)

The execution (E) score for each round is calculated by taking deductions from 10.0 points. The execution faults are explained in more detail in the Table of General Faults and Penalties.

TeamGym4Health Educational Methodology

Tumbling - Table of Difficulty					
LEVELB					
Diff Value	Group 1 Forward elements	K Code	Diff Value	Group 2 Backward elements	K Code
0.2	Cartwheel	X	0.1	Cartwheel	X
0.3	Round off	R	0.2	Round off	R
0.4	Handspring	H	0.3	Flick Flack	F
0.4	Flyspring	FS	0.4	Tucked salto	O
0.5	Tucked salto	O	0.5	Piked salto	<
0.6	Piked salto	>	0.6	Straight salto	/
0.7	Straight salto	\	0.7	Tucked salto Vr twist	01
0.6	Tucked salto Vr twist	01	0.8	Straight salto 1/2 twist	/1
0.7	Piked salto Vr twist	> 1	0.9	Tucked salto 1/1 twist	02
0.8	Straight salto 1/2 twist	\1	1.0	Straight salto 1/1 twist	/ 2
0.9	Tucked salto 1/1 twist	02			
1.0	Piked salto 1/1 twist	>2			
1.0	Straight salto 1/1 twist	\ 2			

Mini-Trampoline (Trampet) - Table of Difficulty					
LEVELB					
Diff Value	Group 1 With vaulting table	K Code	Diff Value	Group 2 Without vaulting table	K Code
0.4	Round off (90° on/90° off)	R	0.2	Tucked salto	O
0.4	Handspring	H	0.3	Piked salto	>
0.5	Handspring 1/2 on	1H	0.4	Straight salto	\
0.5	Handspring 1/2 off	H1	0.5	Tucked salto 1/2 twist	01
0.6	Handspring 1/2 on 1/2 off	1H1	0.6	Piked salto 1/2 twist	> 1
0.7	Handspring 1/1 off	H2	0.6	Straight salto 1/2 twist	\1
0.8	Handspring 1/1 on 1/1 off	1H2	0.7	Tucked salto 1/1 twist	02
0.9	Handspring 1/2 on 1/2 off	1H3	0.8	Piked salto 1/1 twist	>2
1.0	Handspring 1/2 off	H3	0.8	Straight salto 1/1 twist	\ 2
			0.9	Tucked salto 1/2 twist	03
			1.0	Piked salto 1/2 twist	>3
			1.0	Straight salto 1/2 twist	\ 3

3. Forms of assistance

As gymnastics is considered a basic sport, the goal of gymnastics coaches is to teach basic exercises when the gymnast is very young, while older gymnasts during training add small modifications to basic exercises when learning new complex skills. Kerr and al, 2015. have come to a conclusion in various studies that it was highly possible for gymnasts to learn new skills at an older age. American Sport Education Program with USA Gymnastics, 2011. considered that teaching gymnastics skills requires to focus on principles of teaching, and they recommend learning skills within acronym IDEA:

- I Introduce the skill
- D Demonstrate the skill
- E Explain the skill
- A Attend to athletes practicing the skill

The main goal of assistance is to prevent injuries. When a gymnast learns or practices a new skill, presence of a coach is necessary to provide with assistance. Both coach and gymnast must know the correct performance technique of new gymnastic element and its assistance. If the gymnasts are good enough to master performance technique, they can take the role of assistant for younger gymnasts. Training with assistance of gymnasts themselves can be fun and interesting, but only when they learn basic skills. If they learn on training complex gymnastics movements, the assistance must be led by the coach.

The specificity of gymnastics is that when learning a new exercise, you need assistance from the coach, from basic skills to mastering complex one. Every coach needs to know the forms of assistance each gymnastics skills so that learning a new one could be successful. TeamGym coaching has its advantages because it is possible in older ages to provide mutual assistance between gymnasts and coaches. This ensures a spirit of satisfaction, trust in your teammates during training, and the training itself becomes more fun.

In TeamGym as a group sport discipline, gymnasts mutually try to help each other in training a new exercise, in assisting in the performance of a new element, in stretching at the end of training as active participants. Many new exercises that are learned at a younger age become basic at an advanced level. The TeamGym program is also interesting for the friendship that appears during training due to the formation of group exercises that gymnasts learn together.

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The form of training assistance can be individual or group. The group method of assistance is not usual, but it is very effective because all the gymnasts are involved in the same protocol during training. This kind of training form of work is specific and different from any gymnastic discipline, so it is also interesting for the younger population.

4. Basic strength and flexibility program

Gymnastics physical fitness model implies that there are several specific skills that are important for success. As an integrative fitness model for gymnasts is important strength, speed, power, flexibility and stamina (Sands, 1994a; Sands, McNeal & Jemni, 2001b). The strength and flexibility program for gymnasts must be practiced constantly in order to achieve results. The program is individual for each gymnast and the sooner you start working at a younger age, the greater the results will be at an older age. These two skills are very important for success in performing exercises, but they are genetically determined and their development depends on individual characteristics and the ability to identify talent at a younger age. Training environment with effective strength and flexibility training program can improve given range of motion and gymnasts can achieve success.

Definitions of strenght - „Muscular strength is essential component of power and it's proportional to cross-sectional area of the muscle belly“ (George, 2010). Strenth is defined as the amount of the force that can be generated by muscle group (Knuttgen & Komi, 1992; Powers & Howley, 2001).

All gymnasts must considered relative strength to her weight if they want to succeed. Strength training protocol in the beginning stage emphasize proper shape of movement under conditions of low resistance. Designing strength training for gymnast should have a dosed strength training effort. The concept of individualized exercises with appropriate supervision and control of the strenth program must be presented to gymnasts so thay can understands the goal and purpose of the exercises. Young athletes, according to Kraemer et al, 2000. should start with an individualized program that will change over time. A significant increase in the strength training load may reflect the accelerated maturation of the child. It is necessary not to overestimate the ability of a young athlete to endure strength protocol. In the beginning, gymnasts should start with small weights in order to avoid injuries or overtraining. If the principles of strength training are followed, a protocol can be designed that is in line

with the child's development. If we follow the guidelines for development of strength protocol, the program of exercises with load can be applied in every phase of child's development.

When it comes to strength training, the most important thing is to be safe for every young athlete. Injuries occur due to incorrect execution of the exercise, as well as unprofessional assistance. Other factors that increase the possibility of injury are conditions that leads to athletes overload. Due to an inappropriate strength protocol that not match number of series and repetitions with the young athlete age, results of progress are absent. All organizations involved in sports and related to the prevention of injuries in sports, such as National Strength and Conditioning Association, American College of Sports Medicine, Ameican Academy of Pediatrics, American Orthopedics Society for Sports Medcine point out the importance of directing and supervising strength training protocol for young athletes. Only experts in the field of strength training for youngsters can create strength protocol. Guy & Micheli, 2001. consider that strength training under the supervision of experts is safe for pre-pubescent athletes. Professional supervision implies a trainers participation with knowledge of correct performance technique and specific characteristics of strength training for youngsters. Beginner strength training exercises are selected based on strength topography. Based on the statistical analysis of the assessment which muscle groups should be developed in beginners strength training, the following results were obtained (Zatsiorsky & Kraemer, 2009):

- abdominal muscles,
- extensors of the spine,
- extensors of the legs and arms and
- the pectoralis major muscle.

A selection of beginners exercises for youngsters should include exercises that should potentially strengthen weak muscle groups. Large muscle groups that are located in the trunk should be strengthened, especially the muscles of the abdominal wall and the spinal column at youngsters. Movements should be performed through the entire range of joint motion with submaximal repetitive loading. One rule that experienced coaches follow in strength training protocol is the 3 year rule: athlete can perform specific strength exercises after 3 years of general preparation.

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The nature of the elements in gymnastic sports is difficult in terms of functional and coordination complexity and their performance is based on relative strength. Exercise in strength training should simulate movement patterns observed in elite level gymnastics. TeamGym is a discipline that requires speed-powerful reactions and aerobic endurance in its competitive program, the highest level of demands and a high degree of automation of complex movements in the disciplines. In the beginning stage of strength training, the complex movement pattern should be under condition of low resistance training. TeamGym is a very interesting and fun training program where gymnasts help each other, learn and practice exercises that are coordinated complex movements.

Definitions of flexibility - Flexibility is defined as the joint range of motion (Holt, Holt & Pelham, 1995; Alter, 2004; George, 2010). Development of potential joints range of motion primarily depends on two factors, by George, 2010:

Structural limitations on joints range of motion are due to the body's non-elastic components;

Functional limitation on joints range of motion are due to the restraining effect of the body elastic structure.

Flexibility training protocols have several fundamental types and which of them can better determine which program meets the best needs of the gymnasts:

- *Static flexibility training* is considered more appropriate in the initial stage of training, during warm-up session for all level gymnasts and for the purpose of rehabilitation as fundamental protocol. Static stretching has been implemented in two methods: *Static – Passive* and *Static – Active Method*. Static-Passive method is considered non-functional in nature because the motion for the stretched position is derived externally by someone else. Static-Active method is functional because it requires of gymnasts to use only the specific muscles responsible for holding the body part in stretched position.
- *Dynamic flexibility training* refers to use body movements in specific ballistic or swinging fashion to achieve increased range of motion. Dynamic-Passive method is similar as Static-Passive method by involving external force to stretch target joint but in rhythmic, bouncing mode. Dynamic-Active method is considered the most advanced flexibility training protocol, because it requires acceleration. Dynamic-Active method is considered the most advanced flexibility training

protocol, because it requires acceleration maximum range of motion as possible.

Static flexibility training protocol is recommended in the initial stages because it has advantages:

- less danger of exceeding the extensibility limits of the tissues involved;
- energy requirements to perform the exercise are low;
- it relieves muscular soreness that sometimes accompanies dynamic stretching.

TeamGym training take care of development of strength and flexibility of the exercises that are performed in group composition. Exercises in Tumbel and Trampet are basic in youngsters and very complex gymnastics skillss in advanced program. Both strenth and flexibility program must be well designed with exact number of repetition and training loads. Therefore, it is necessary to separate the program of basic strength and flexibility from more complex exercises that require an advanced level of the program. In TeamGym training Static-Passive method is considered for use because teammate can work together for flexibility progress. Therefore, flexibility training becomes interesting because one gymnast influences the improvement of flexibility of another gymnast by using Static-Passive method exercises. Each training session should pay attention to the intensity of flexibility training. The level of intensity, according to George, 2010., should allow every gymnasts to tolerate applications of the given flexibility protocol. The gymnasts are actually stretch beyond the horizontal position, i.s. more than 180 degrees (Monèm & Sands, 2018). A variety position of forward,, backward, sideward and sometimes in longitudinal plane of upper and lower limb, neck and spine should demonstrate in gymnastics routine. Flexibility is a motor skill that is essential for maintaining proper performance technique. Some of the acrobatic exercises used in the TeamGym competition program require a high degree of shoulder and spinal flexibility. Depending on the age, flexibility is lost with increasing years. That is why it is necessary to continuously train the stretching of individual groups, from youth to older senior competition.

Flexibility tests are proposed by International Gymnastics Federation (FIG) through Physical Ability Testing Program (PAT) in Age Group Development and Competition Program for Men and Women's Artistic Gymnastics. Tests for strength and flexibility shows what the demands are for the development of the flexibility and power skills.

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2. Team Gym Rules: 10 hours

1. Technical instruction - TG competition program;
2. Recognition of elements - CoP;
3. General rules for Floor, Tumble and Trampet;
4. The content and structure of exercise on Floor;



5. Technical Regulations (competition format, competitors, composition, starting order, tiebreak rules).

1. Technical instruction - TG competition program

European Gymnastics developed a new gymnastic discipline called TeamGym. TeamGym competition was held in Scandinavia. It is a teams competition, presenting performances with music on three apparatus: Floor, Tumble and on Trampoline (mini-trampoline).

Teams which compete in TeamGym can be Male teams, Female teams and Mixed teams (half male and half female). Categories can be both Junior and Senior. Each team can consist of 8-10 gymnasts. All regulations and rules for this discipline are found in the Technical Regulations (TR), which are available on the European Gymnastics website. The TR contain additional information covering such things as delegation composition, number of gymnasts, reserves, inquiries, juries, etc.

2. Recognition of elements - CoP

The Code of Points (CoP) are the rules that:

- Provide basic objectives for evaluating TeamGym exercises, at all levels of regional, national, and international competitions;
- Judging standardization on the official competitions;
- Assure the identification of the best teams in any competition;
- Guide coaches and gymnasts in the composition of competition exercises.

This Cod has 4 parts, covering the following areas:

- The CoP and Rules for Participants;
- Evaluation of the Exercises;
- Rules per Apparatus and
- Appendices (A1-A6).

The recognition of elements on the Floor have their difficulty value of each group. Table of difficulty elements on Floor are given in Appendix 1. In the Table 1. we gave some of them.

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Table 1. Floor Basic Element - TeamGym CoP 2022

<i>Dinamic Balance Pirouettes</i>	0.20	0.40	0.60	0.80	1.00
FORWARDS	Full rotation (360°)		One and ½ full rotation (540°)	Double Full rotation (720°)	Double and ½ full rotation (900°)
BACKWARDS	Full rotation (360°)		One and ½ full rotation (540°)	Double Full rotation (720°)	Double and ½ full rotation (900°)
FORWARDS- Free leg with hand support 90°.		Full rotation (360°)		One and ½ full rotation (540°)	Double Full rotation (720°)
FORWARDS - Free leg without hand support 90°.			Full rotation (360°)		One and ½ full rotation (540°)
<i>Dinamic Balance Power Elements</i>	0.20	0.40	0.60	0.80	1.00
Press up to Handstand				With split straight legs (DB805).	
Press up to Handstand					With straight legs together (DB1006).
Press up to Handstand					Press up to handstand from straddle pike sitting support
Press up to Handstand					From a pike sitting support press to handstand.
<i>Dinamic Balance Power Elements</i>	0.20	0.40	0.60	0.80	1.00
From Handstand to planche		Headstand to frog	Headstand to planche		
From Handstand to support			Headstand to frog		
From Handstand to straddle pike or pike sitting suppo				Lowering from handstand to ...	Legs together
<i>Standing Balances</i>	0.20	0.40	0.60	0.80	1.00
Side balance with help of hand. Free leg on the side with help of hand. Body in upright position.			Leg separation 120°	Leg separation/ tiptoes position	Leg separation 180°
Side balance without help of hands		Leg separation 90°		Leg separation 120°	Leg separation 120° on tiptoes
Frontal balance. Free leg in front with help of hand/ hands			Leg separation 120°	Leg separation 120° on tiptoes	
Frontal balance. Free leg in front without help of hand/ hands	90°	On tiptoes	90° on tiptoes	120°	120° on tiptoes
Upper body at horizontal, free leg to the side. Heel defines the angle to the hip			Leg separation 90°	Leg separation 120°	
Scale. Upper body must be horizontal or above.		Leg separation 90°		Leg separation 120°	Leg separation 120° on tiptoes
Scale sideways without help of hand				Leg separation 90°	Leg separation 120°

Table 1. 2 Floor Basic Element - Jumps, Leaps and Hops

Group	Basic element	Value
Jumps starting and landing with two feet	Stretch jump with twisting 360°	0.40
	Stretch jump with twisting 540°	0.60
	Stretch jump with twisting 720°	0.80
	Tucked jump with twisting 360°	0.80
	Tucked jump with twisting 540°	1.00
	Straddle pike jump with or without twisting	0.60
	Straddle pike jump with or without twisting 180°	0.80
	Straddle pike jump with or without twisting 360°	1.00
Jumps standing with two feet and landing on one foot	Sheep jump - Feet at shoulder height	0.80
	Sheep jump - Feet at head height	1.00
	Sheep jump twisted 180°	1.00
	Double stag jump with or without twisting	0.20
	Double stag jump with or without twisting 180°	0.40
	Double stag jump with or without twisting-Foot at head high	1.00
	Wolf jump with or without twisting	0.20
	Wolf jump with or without twisting 180°	0.40
	Wolf jump with or without twisting 360°	0.80
	Split jump - Leg separation 135°	0.40
Jumps starting with two feet and landing on one foot	Split jump - Leg separation 180°	1.00
	Sissone - leg separation 135°	0.40
	Sissone - leg separation 180°	0.80
	Sissone - Foot at head high	1.00
	Double stag jump with or without twisting	0.20
	Double stag jump with or without twisting 180°	0.40
	Double stag ring	1.00
Leaps starting on one foot and landing on the other	Cat leap twisting 360°	0.60
	Cat leap twisting 540°	0.80
	Cat leap twisting 720°	1.00
	Scissors leap-Leg separation 135°	0.60
	Scissors leap 180°-Leg separation 90°	0.40
	Scissors leap 180°-Leg separation 135°	0.80
	Scissors leap 180°-Leg separation 180°	1.00
	Butterfly fwd or bwd	1.00
	Split leap to straddle pike position with twisting 90° leg separation 135°	0.60
	Split leap to straddle pike position with twisting 180° leg separation 135°	0.80
	Split leap forward leg separation 90°	0.20
	Split leap forward leg separation 135°	0.40
	Split leap forward leg separation 180°	1.80
	Split leap forward leg separation 180°	1.00
	Switch leap leg separation 135°	0.60
	Switch leap leg separation 180°	0.80
	Switch leap leg separation 180° foot and scholder high	1.00
	Switch leap to front laying support leg separation 135°	0.60
	Switch leap to front laying support leg separation 180°	0.80
	Stretched hop with twisting 360°	0.80
	Stretched hop with twisting 540°	1.00
	Tucked hop with twisting 360°	1.00

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Table 1. 3 Floor Basic Acrobatic Elements

Forward Elements	Basic element	Value
Forward saltos from one foot to one foot Forward saltos from one foot to two feet Forward saltos from 2 feet Handspring elements	Siting salto	0.60
	Tucked salto fwd	0.80
	Piked salto	1.00
	Tucked salto fwd	0.80
	Tucked salto fwd 1800	1.00
	Tucked salto/ Tucked salto fwd 1800	0.60
	Piked salto/ Piked salto 1800	0.80
	Handspring	0.60
	Free handspring	1.00
	Hnds to fwd roll	0.20
	Endo roll	0.60
	Endo roll to Hnds	1.00
	Walk over fwd	0.40
	Hnds 1800 to walk over fwd	1.00
Backward Elements	Basic element	Value
Bwrđ salto elements Giner salto elements Bwrđ elements Bwrđ roll elements Bwrđ walkover elements	Tucked piked salto	0.60
	Straight salto	1.00
	Giner salto tucked	0.60
	Giner salto piked	0.80
	Giner salto layout	1.00
	Roundoff	0.20
	Flic flac	0.40
	Flic flac to front support	0.60
	Giner flic flac	0.80
	Bwd roll to Hnds	0.40
	Bwd roll to Hnds with 1800	0.80
	Bwd roll to Hnds with 3600	1.00
	Walk over bwd	0.40
	Walk over bwd from sitting - Valdez	0.60
	Valdez with 3600 turn in Hnds	1.00
Group Elements	Basic element	Value
Lift Throw	Lift	0.60
	Lift with rotation or twist	1.00
	Throw	0.80
	Throw with rotation or twist	1.00
Flexibility Elements	Basic element	Value
Straddle pike sitting fold Split Bridge	Japana	0.40
	Japana 450	0.80
	Standing/siting pike fold	0.80
	Split 1800	1.00
	Side split 1800	1.00
	Bridge	0.40
	Bridge Thigh vertical	0.60
	Bridge Leg 45° from vertical	0.80
	Bridge Leg vertical	1.00

Table 2. Basic Element Values - Tumble

Group	Basic element	Value
Group 1 – forwards	Cartwheel	0.10
	Handspring	0.20
	Flyspring	0.20
	Tucked salto	0.20
	Piked salto	0.30
	Straight salto	0.40
	Starting salto*	
	- Tucked	0.20
	- Piked	0.30
	- Straight	0.30
	- Straight full twist	0.40
	Double salto tucked	1.20
Group 2 – backwards	Double salto piked	1.40
	Double salto straight	1.60
	Round-off	0.10
	Flick Flack	0.20
	Tucked salto	0.20
	Piked salto	0.20
	Straight salto	0.30
	Whipback	0.30
	Double salto tucked	0.80
	Double salto piked	0.90
	Double salto straight	1.10
	Triple salto tucked	1.60
	Triple salto piked	1.90

Table 3. Basic Element Values – Trampet

Group	Basic element	Value
Group 1 – with vaulting table	¼ on 14 off	0.30
	Handspring	0.40
	Handspring ½ on	0.40
	Handspring salto tucked	0.80
	Handspring salto piked	0.90
	Handspring salto stright	1.00
	Handspring double tuck ½ out	1.70
	Handspring double piked ½ out	1.90
	Handspring double straight ½ out	2.10
	Tsukahara tucked	0.80
	Tsukahara piked	0.90
	Tsukahara stright	1.00
	Double Tsukahara tucked	1.60
	Double Tsukahara piked	1.80
	Double Tsukahara stright	2.00
	Tucked salto	0.10
	Picked salto	0.10
	Stright salto	0.20
Group 2 – without vaulting table	Double salto tucked	0.60
	Double salto piked	0.70
	Double salto stright	0.80
	Triple salto tucked ½ out	1.50
	Triple salto piked ½ out	1.70
	Triple salto stright ½ out	1.90

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3. General rules for Floor, Tumble and Trampet

FLOOR General Requirements are:

- a) Program on Floor is a routine for the whole team, performed with instrumental music,
- b) Floor program has limited time, from 2 minutes and 15 seconds to 2 minutes and 45 seconds,
- c) On the Floor program all competing gymnasts of the team must participate,
- d) Program must be performed inside the floor area (14 m x 16 m),
- e) The team must jog into the competition arena when the competition organisers direct them. The team lines up at the edge of the floor area where they wait for the green flag/light. After the green flag, the team jog to their starting position on the floor. They start their program when the music starts

Floor Composition Requirements (2.0)

The Composition score consists of four different composition requirements. These requirements are:

- Difficulty element in moving sequence (DS)
- Rhythmic sequence (RS)
- Two (2) Planes (↑, ↔)
- Formations
 - 8 different formations
 - A moving curve formation (CF)
 - A large formation (LF)
 - A small formation (SF)

For each missing requirement there will be a 0.2 deduction. All these components must be marked on the tariff form's Composition column.

Open value for Floor Difficulty Requirements

The Program should have that kind of gymnastics elements that should point out style and technical precision and not only difficulty values. The selected elements should always fit the knowledge and maturity of the gymnasts.

The Difficulty score consists of the judges' evaluation of ten (10) different difficulty elements. These elements must all be marked on the tariff form. All

element values and difficulty requirements are shown in the Table of Difficulty in Appendix A1.

These required elements are:

- Three (3) balances
- Three (3) jumps/leaps/hops
- Two (2) acrobatic elements
- One (1) group element
- One (1) flexibility element

Execution Requirements (10.0) on Floor

Execution deductions can be made under the following headlines:

- Synchronisation
- Uniformity
- Dynamic execution
- Amplitude and extension
- Balance and controlled execution
- Precision in formations
- Transitions
- Performance in difficulty elements
- Wrong number of gymnasts
- Fall
- Line violations
- Movements corresponding to music

All deductions are subtracted from 10.0. Bonus (0.1) can be added to each judge's execution score.

The Score on Floor program is divided into three parts: Composition, Difficulty and Execution. Teams Final score consists of three parts which adds together. Final score (FS) consists of:

C-score (Composition): Composition score is calculated from 8 requirements: Rhythmic sequence (RS), Difficulty element in moving sequence (DS), Planes (sideways, backwards), Formations (8 different, small, large, moving curved formation);

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D-score (Difficulty): D-score stands for difficulty, and this is an “open code” meaning there is no roof on how much you can earn in difficulty. Not entirely true with no roof since you can only choose 10 different elements from the *Ttable of difficulty* (CoP, Appendix A1) and the table has an upper limit (chapter about Difficulty below);

E-score (Execution): The E-score starts from 10.00 and is then deducted throughout the program and is summed up in the end end (chapter about Execution below).

| Composition

The composition is consists of 8 requirements. As long as the gymnasts perform the elements as intended, you will basically know in advance what score you will get. The explanation of all composition requirements can be found in the Code of points (CoP Art 22).

1. Composition - Rhythmic sequence (RS): is a movement phrase where travelling movements are connected so that the team moves over the floor; either from side to side, back to front (or reversed) or diagonal. Travelling movements means that gymnasts must move with the time and music and it can't be pauses in the sequence. The team performs the same sequence at the same time, where mirroring is allowed in either one or two groups. Change of tempo in the movements sequence should be noticed. The sequence can not include any Difficulty elements (DS). The key word here is that the sequence should travel across the floor area so active footwork should be shown, e.g.: the sequence should never stop but constantly be moving (excerpt from TeamGym – ABC for Floor, EG official site). Movements can come from different categories of elements/movements. Movements have to be performed in other rhythmic patterns, then the basic pulse of the music. This to get the change of tempo. The starting and ending position should not be further than 3 meters from the floor edges and 5 meters from the corners if the sequence travels diagonal. When team is divided in one or two groups, there are 3 options of travelling, changing formations allowed (Figure 2):

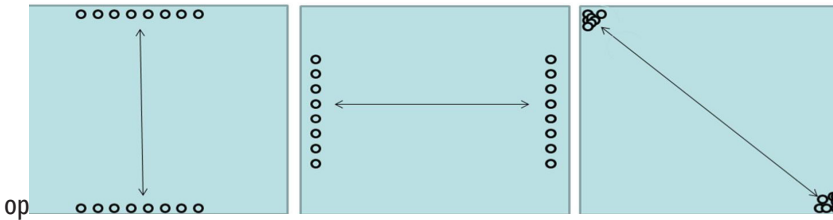


Fig 2. Travelling options in TeamGym formation

2. Composition - Difficulty element (DS): One difficulty element such as leap, hop or acrobatic element with take-off and landing on one foot is required. Continuous passages of choreography requests at least three (3) different moves before and three (3) different moves after the DS. The aim of these requirement is to reduce the preparation time (standing still) that teams often use before actually performing the D elements.

3. Composition – Planes: requires sequences of travelling movements when all team gymnasts moves at the same time in two different planes:

At least three (3) different movements where the side of the body is leading (frontal plane – door plane). *Frontal plane – Door plane*: this plane is about width and height, and you can imagine that you are moving as a sliding door. The gymnast should feel that the side of the body is leading;

- At least three (3) different movements where the back of the body is leading (sagittal plane –wheel plane). *Sagittal plane – Wheel plane*: this plane is about height and depth, and you can imagine that you are moving in the direction of a wheel. The CoP only requires a sequence where the back is leading. In order to enhance the gymnasts' awareness about the wheelplane it could be a good idea also to work in phrases where the front is leading. This way they will feel the contrast between backwards and forward;
- Sequences forward in the wheel plane are not included in the requirements of the composition but should be added as an additional travelling sequence.

The gymnasts must move within the same plane throughout the whole sequence. The sequences can be performed with intermediate steps, in a straight line or in a curved pattern. Gymnast keeps the movements within the plane. The movement sequences in the different planes can also be included in the Rhythmic Sequence. Acrobatic elements are forbidden to use as part of the sequences in planes. Turning ($>45^\circ$) is not allowed during planes.

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4. Composition – Formations are patterns which all team is forming on the floor. There are three (3) basic requirements: number of formations, shape of formations and size of formations.

1. Number of formations – eight (8) different formations must be performed during the floor program. Different formation on floor area must be performed with different patterns. For example, a small circle and a large circle are the same pattern and will not be considered as different. The same formation will count if the gymnasts are standing in two straight lines and the lines just change positions on the floor area (two lines);
2. Shape of formations - in the Floor program there must be one formation that shows a moving curved pattern. In order to get a moving curved formation, there has to be at least four (4) gymnasts positioned in that formation following each other along the curved pattern. A moving curved formation is clearly curved and contains at least three (3) elements. All gymnasts have to be engaged in it at the same time. The curved formation might appear in time when the gymnasts are moving, even if the pattern on the tariff-form shows a more squared formation;
3. Size of formations - one formation in group routine has to be small and one large. In the small sized formation all gymnasts must be positioned within the floor area of four by four metres (4m x 4m). Large sized formation requirement is when team has to cover the floor area from back to front and from side to side. A limit of one (1) metre from each edge is allowed so that the gymnast does not have to be fully out on the carpet. The formation should be seen as one formation and not several different small ones spread out over the floor area. This means that there should be a connection between the gymnasts so no big gaps between them.

Difficulty (DS)

The Table of Difficulty in Code of Points (Appendix A1) are defining difficulty value of elements in order to choose suitable difficulties for the Floor routine. There are five (5) categories of difficulties to choose from and then one should be in the DS and 3 after 1:30 min. Difficulty value (DS) on Floor routine defines:

1. three (3) different balances (one must be a handstand);
2. three (3) different jumps/ leaps/ hops;
3. two (2) different acrobatic elements;
4. one (1) group element;
5. one (1) flexibility element.

All difficulties in floor routines must have different codes numbers. All gymnasts must perform the same difficulty element at the same time and there should not be more than three steps to prepare for the difficulty (a chassé is not considered a step). The only exception is the element performed in the DS (only one step is allowed before the difficulty element).

Difficulty value for balance elements are divided in three different groups:

Dynamic balances: pirouettes and power – elements;

- Standing balances: standing on one leg with free leg in certain position (need to be in position for at least two seconds);
- Hand supportive balances: where the weight is placed on hands (need to be in position for at least two seconds).

The three (3) balances has to be chosen as such:

1. One handstand HB1001;
2. One standing balance;
3. One optional balance.

Difficulty - Dynamic balances: Pirouettes

To get the difficulty value for – Pirouettes, their rotation must be measured by the hip, fulfilled and without jumping. A pirouette starts when the free leg and the heel are lifted from the ground and is finished when:

- The rotation is over or
- The heel of the supporting leg is touching the floor or
- The free leg is touching the floor.

Gymnastics turn has to start by facing the same direction even though mirroring is allowed (e.g.: the gymnasts may turn on different legs as long as they are performing the same type of pirouette). There is a possibility to perform the pirouettes in different groups (at least three gymnasts) but all groups must start to perform the turn facing the same direction. Pirouettes are recognized as:

1. *forward pirouette* - when you turn in the same direction (towards) as the supporting leg;
2. *backwards pirouette* - when you turn in the opposite direction (away from) as the supporting leg.

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Difficulty - Dynamic balances: - Power elements

Definition of power element, according to European Gymnastics website (<https://www.europeangymnastics.com/discipline/teamgym/contact>) is that "element must be a controlled movement with dynamic strength. The starting and ending positions must be clearly visible. Movement must be controlled and performed without a pause. Handstand as a starting or ending position in power elements must have straight legs together and arms and hip straight".

Difficulty - Standing balances are elements where whole body is held in a static position for at least two (2) seconds without any additional movement.

Difficulty - Hand supportive balances are elements with the same definition as Standing balances elements. The mandatory Handstand (HB1001), gymnast must have the legs in the same position above hip level. The alignment of the body must be straight with no additional movement. The placement of legs in HB1001 is optional for the team, but must be equal to or above hip level. In the Straddle pike and Pike sitting balances, where the legs are lifted over the horizontal level, there must be no leaning on the arms. Both hands must be placed at the side of the body, close to the hips.

Difficulty – Jumps

Jumps must be recognised as position formed in the air during a jump or a leap or a hop. The shape during the flight, twists and landing position define the level of the difficulty of the element. Jumps are divided in to three categories:

1. *Jumps* are movement pattern with take-off from two feet and land on one or two feet or in front laying support;
2. *Leaps* are movement pattern with take-off from one foot and land on the other foot or both feet or in front laying support;
3. *Hops* are movement pattern with take-off from one foot and land on the same foot.

In the floor program there must be three (3) different jumps. One jump could be performed inside the DS (leap or hop). In jumps with twists all gymnasts must start the jump facing the same direction, according to the choreography (valid only in jumps, not in leaps and hops).

Difficulty – Acrobatic elements

All acrobatic elements must comply with norms of TeamGym. The table of difficulty states what elements is required to choose. Acrobatic elements (e.g.: saltos) are often performed combined with for example a cartwheel or a round off. In the Floor program there must be two acrobatic elements from *two different rows* in A1 Appendix. One acrobatic element can be performed inside the DS (take off and landing from one leg). For Difficulties score only ten elements can be counted.

Difficulty – Group Elements

Group Element is movement pattern when all gymnasts must take part and play an active role in either a visible lift off the floor or a throw (e.g.: lift, being lifted, throw and/or catch or being thrown) which can be done together with the whole team or in groups of at least three (3) gymnasts. The elements must be performed at the same time. Different groups must perform Group Elements with the same code number, but the elements do not need to look the same. There are two (2) types of group elements: Lift and Throw.

Lift means that the group must get at least one of the gymnasts totally off the floor by the active support of fellow gymnasts. One Group Element from Appendix A1 (marked on the tariff form) is required. The rotation or twist during the lift is measured from ground to ground. The rotation or twist during the throw is measured during the free flight phase.

Difficulty – Flexibility Elements

One flexibility element from A1 Appendix is required and It has to be marked in the tariff form. Additional flexibility elements can be performed as long as they are not marked on the tariff form. The whole team must perform the same flexibility element, which they perform at the same time according to the choreography. The position in the flexibility element must be shown clearly.

Difficulty Distribution

Difficulty elements must be spread evenly in the Floor program. At least three (3) difficulty elements must be performed after 1 minute 30 seconds (started after 1 minute and 30 seconds). The recommendation is to have a ± 5 second margin since different sound systems might play the music in different tempo. If three different difficulty elements are not performed after the time limit, the

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team will lose the value of those elements (even if the performance would be perfect) that are performed before the time limit.

This difficulty distribution deduction concerns only the three last D-elements. The time of 1 minute 30 seconds must be marked on the tariff form with a horizontal straight line and letters DD.

Execution

The Execution deductions or E – score are divided into two (2) parts: the *summarised execution deductions and additional execution deductions*. There is also a bonus included in execution where the team can be rewarded an extra 0.1 if the performance is presented in an excellent way.

Execution – Time limit

The routine starts with the music and stops when the last movement has been fully performed. The limit of the routine is between 2:15 and 2:45 minutes.

Execution – Music

The music has to be instrumental. You are allowed to put a human voice in music, but as long as there is no words spoken or sung. Humming, whistling and other ways to use your voice without forming any words are allowed.

Execution – Performance

Performance are defined throw good technique, when the gymnast uses just the right amount of energy, force and speed in performing the different movement. Movements in the Floor program has to be divided into different parts; the *difficulty elements*, working as a team and all the other (the dance) elements/movements.

The technique in the difficulty elements should comply with the norms of gymnastics: good posture, clear positions, height positions in jumps and acrobatic elements, flexibility and strength. For some difficulty elements there are specific requirements, these are specified in the table of difficulty in A1 Appendix.

The technique in the difficulty elements should comply with the norms of gymnastics e.g.: good posture, clear positions, height (in jumps and acrobatic elements), flexibility and strength. For some difficulty elements there are specific requirements, these are specified in the table of difficulty in Appendix A1.

TeamGym is performing as a team and the Floor program is really the centrepiece in this aim. There are requirements about different kinds of formations throughout the program. In order for the judges to see the different shapes of the formations it is important that the gymnasts are correctly placed. The hardest part when it comes to formations is changing from one formation to another.

TeamGym at the Floor program looks like they are as one. They work in unison and they are fully synchronised. You are allowed to work in canon, in different groups and even to do completely different movements but the unspoken rule is that synchronised teamwork is preferred. However, doing different movements and working in different time can be effective to highlight the program.

All movements in the choreography should be performed in the same way. That means that arms and legs should be in the same position and following the same movement patterns, curves in the torso should be performed in an identical way, that difficulty elements are performed with the same technique. The overall effect should make the team appear as one.

Changing gymnasts' positions from one formation to another is called a transition. Preparing to perform the group element can be called a transition. All transitions must be fluent, made as a part of the program by doing gymnastics. Execution of the movements are not being compromised just because the gymnast has to find the new formation. There are two categories of deductions that are being made: Quality of transitions (*included in Dynamic Execution*) and Easy access.

First quality of transitions included in Dynamic Execution - changes between formations must form a natural part of the program. There must be gymnastic or rhythmic qualities, whole bod must be engaged in every movement.

Second easy access - The gymnasts cannot be forced to shorten their movements just in order to get to the new formation.

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Tumble General Requirements are

1. Each team performs three different tumble rounds, where each series must consist of a combination of at least three acrobatic elements without intermediate steps or pauses;
2. For juniors, one round may consist of only 2 acrobatic elements. The two other rounds must consist of at least three acrobatic elements as for seniors;
3. The program is performed to music, which must be instrumental without lyrics;
4. The time limit is 2 minutes and 45 seconds;
5. The team presents six gymnasts for each round. Different gymnasts from the team may perform in each round;
6. Mixed teams must have the same number of male and female gymnasts performing in each round;
7. All tumble performers must participate in the Floor Program unless excused by the European Gymnastics doctor due to injury (Penalty is disqualification of the team);
8. The team must jog into the competition arena when the competition organizers direct them. The team lines up at the run up where they wait for the green flag/light. When the team is in position and they get the green flag from the Head Judge (E1) the music will begin, and the team may start their program;
9. Marking the run-up or the tumble track with clothes or other things is not allowed. A tape measure will be attached to the floor at the side of the run-up. It will measure distance from the start of the landing area;
10. All gymnasts must land their last element in the landing area;
11. After the first and second rounds, the gymnasts must return by jogging back together;
12. One coach (and only one) must be present for safety spotting on the landing mat, preferably on the far side from the judges. The coach is temporarily allowed to step onto the tumble track.

Tumble Composition Requirements (2.0)

1. First Round: All gymnasts perform exactly the same series (Team Round);
2. Second Round: All gymnasts perform the same series or increase difficulty;
3. Third Round: All gymnasts perform the same series or increase difficulty;
4. At least one round must be backwards, where all performed element(s) in the series are backward (TeamGym CoP 2022 Page 64 of 90);
5. At least one round must be forwards, where all performed element(s) in the series are forward;
6. In one other round, there are no requirements for element direction, and they may be forward, backward or a combination of forward and backward elements;
7. When twisting doubles or triples with less than three twists in the Team Round the gymnasts must perform the same number of twists in each salto;
8. The team must show a great variation in the chosen series (see Art 26.2).

Tumble Difficulty Requirements (Open value)

1. The choice of elements in the program should never sacrifice style and technical precision in favour of difficulty. The selected elements should always fit the knowledge and maturity of the gymnasts;
2. The difficulty value for all valid basic elements is found in Art 27.4 with additional values in Art 27.5;
3. Triple saltos with blind landing are for safety reasons not recommended and will result in a composition deduction (see Art 26.2.7). A blind landing occurs when the gymnast lands the triple salto in the forward direction (+/-90°).

Table 4. Table of Tumble Composition Deductions

Tumble Composition Deductions	Deduction
1. Missing Team Round	0.2 per gymnast
2. Not Correct Order in 2nd and 3rd Rounds	0.1 for gymnast each time
3. Repetition of the Last Element	0.2 per gymnast each time
4. Missing Forward or Backward rounds	0.2 per gymnast
5. Not Fulfilling Twist Requirement	0.2 per gymnast
6. Not Fulfilling Double salto Requirement (Senior Teams only)	0.2 per gymnast

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Tumble Execution Requirements (10.0)

- a) The execution (E) score for each round is calculated by taking deductions from 10.00 points according to Art 28.2. The execution faults are explained in more detail in the Table of General Faults and Penalties contained in Appendix A6;
- b) Execution Bonus (+0.1) can be added to the execution score as explained in Art 28.5.

Trampet General Requirements are:

1. Each team performs three different trampet rounds;
2. The program is performed to music, which must be instrumental without lyrics. The time limit is 2 minutes and 45 seconds;
3. The team presents six gymnasts for each round. Different gymnasts from the team may perform in each round;
4. Mixed teams must have the same number of male and female gymnasts performing in each round;
5. All trampet performers must participate in the Floor Program unless excused by the European Gymnastics doctor due to injury (Penalty is disqualification of the team);
6. The team must jog into the competition arena when the competition organizers direct them. The team lines up at the run up where they wait for the green flag/light. When the team is in position and they get the green flag/light from the Head Judge (E1) the music will begin, and the team may start their program;
7. Marking the run-up with clothes or other things is not allowed. A tape measure will be attached to the floor at the side of the run-up. It will measure distance from the start of the landing area;
8. Once the performance has started there should be no further adjustment of apparatus, unless there is a technical fault;
9. After the first and second rounds, the gymnasts must return by jogging back together;
10. Two coaches (and only two) must be present for safety spotting on the landing mat.

Trampet Composition Requirements (2.0)

1. First Round: All gymnasts perform exactly the same element (Team Round);
2. Second Round: All gymnasts perform the same element or increase difficulty;

3. Third Round All: gymnasts perform the same element or increase difficulty;
4. At least one round must be performed on the vaulting table;
5. At least one round must be performed without the vaulting table;
6. When twisting doubles or triples with less than three twists in the Team Round the gymnasts must perform the same number of twists in each salto;
7. The team must show a great variation in the chosen series (see 30.2).

Trampet Open value Difficulty Requirements

1. The choice of elements in the program should never sacrifice style and technical precision in favour of difficulty. The selected elements should always fit the knowledge and maturity of the gymnasts;
2. The difficulty value for all valid basic elements is found in Art 31.4 with additional values for twists in Art 31.5. There are separate allowed basic elements with and without the vaulting table;
3. Triple saltos with blind landing are for safety reasons not recommended and will result in a composition deduction (see Art 30.2.6). A blind landing occurs when the gymnast lands the triple salto in the forward direction (+/-90°).

Trampet Execution Requirements (10.0)

1. The execution (E) score for each round is calculated by taking deductions from 10.00 points according to Art 32. The execution faults are explained in more detail in the Table of General Faults and Penalties contained in Appendix A6;
2. Bonus (+0.1) can be added to the execution score as explained in Art 32.5.

Table 5. Trampet Composition Deductions

Trampet Composition Deductions	Deduction
1. Missing Team Round	0.2 per gymnast
2. Not Correct Order in 2nd and 3rd Rounds	0.1 per gymnast each time
3. Repetition of Elements	0.2 for gymnast each time
4. Not Fulfilling Twist Requirement	0.2 per gymnast
5. Not Fulfilling Requirement for Double or Triple Saltos	0.2 per gymnast
6. Blind Landings in Triple Saltos	0.3 for gymnast each time
7. No Round With or Without the Vaulting Table	2.0 per team

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Floor exercise in TeamGym considered as the most complex discipline, because whole team is performing together at the same time with music. Floor exercise have a lot of composition requirements and gymnasts need to perform the same elements at the same time with the same dynamic execution and expression, which makes it really difficult for beginners. Program for Floor exercise could be explained as dance routine where gymnastic and acrobatic elements are combined with music where.

The main requirements of Floor program are, according to European Gymnastics website (<https://www.europeangymnastics.com/discipline/teamgym/contact>) are:

- Instrumental music;
- Time limit of 2:15 to 2:45 minutes;
- Choreography based on gymnastic elements where the whole body is engaged;
- All movements and elements shall favour a dynamic execution where the movement phrases show continuity with a logical and natural fluency without unmotivated stops;
- Difficulty elements that are distributed over the whole program;
- A variation of different formations (shapes);
- Moving rhythmic sequence & Difficulty element in a moving sequence;
- Movements in different planes;
- Movements that are corresponding to the music.

Technical Regulations

(competition format, competitors, composition, starting order, tiebreak rules)

Technical Regulations have specific rules for TeamGym and these rules are pulled out from Edition TR 2024-2025. Competitions in TeamGym have the qualifications and finals for seniors and juniors. The participation in all three apparatus is compulsory. They are organised in the three TeamGym apparatus: Floor, Tumble and Trampet. TeamGym European Championships consist of senior and junior competitions in:

- Women's Teams;
- Mixed Teams (50% male and 50% female gymnasts competing in each apparatus/round) and
- Men's Teams.

The number of accredited gymnasts per team is 8 - 12. This may be a minimum of 8 and a maximum of 10 gymnasts plus additional reserves within the accredited maximum of 12. All declared gymnasts must perform the floor program. If a gymnast is injured during the competition prior to the floor, the following disposition will be applied. Reserves may only be used in case of injury or illness confirmed by the official doctor of the European Championships. The affected gymnast can then be replaced with an accredited reserve. Gymnasts that are replaced may not participate further in the Championships. For the Finals is required a new team declaration.

Qualifications for Seniors and Juniors - the Federations can participate with a maximum of 1 women's team, 1 mixed team and 1 men's team in the senior and junior competitions (in total 6 teams maximum).

Finals for Seniors and Juniors - the 8 Teams with the highest ranking from the Qualification are qualified for the Finals. Teams in the final starts from zero score. If there are less than 12 teams in a section, only 6 will proceed to the Final.

Duration of the event - as a general rule, the European Championships for seniors and juniors are organised in 5 days at the same venue, in the same week.

Each Federation may bring maximum 1 team in each section in both the senior and junior competition. A team may consist of 8 - 12 accredited gymnasts, in women's, men's and mixed teams, including any reserves, 3 coaches and 1 physiotherapist. Gymnasts may only compete in one team at the combined Junior or Senior Championships. The maximum size of the official delegation for each federation is as follows: Head of delegation - 1 for the combined junior/senior Championships, Team Manager - 2 for senior teams and 2 for junior teams, Doctor - 1 for the combined junior/senior Championships, Judges - 3 for the combined junior/senior Championships.

Judges - all judges must be holders of the nationality of their national federation (NF) and be in possession of the European Gymnastics TeamGym brevet for the corresponding cycle. Each participating NF is obliged to nominate at least one judge. The maximum number of judges per NF is three.

Starting order - teams are decided by an official drawing of lots in the presence of representatives of the TC and published in the work plan. Federations may witness the draw. To increase the interest in the finals, the top teams from the qualifications (half the number of teams in the final) will be allocated the last

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performances in the starting list. The draw is done in two steps, first for the starting order of the last teams qualified for the final, followed by the draw for the first teams qualified for the final. Further details are to be found in the TeamGym Competition Manual.

Tiebreak rules - in case of equality of the total score in the Qualifications or Finals, the following principles apply. In case of 3 or more teams with the same total score, the teams are compared two at a time before being ranked.

1. The Team getting 2 apparatus wins when compared with the other team, gets the highest ranking. This is not the sum of the 2 highest Final Apparatus Scores, but winning 2 of the apparatus over the other team.

In case of further equality:

2. The Team with the highest final score in any of the apparatus gets the highest ranking.

In case of further equality:

3. The Team with the second highest final score in any of the apparatus gets the highest ranking.

In case of further equality:

4. The Team with the highest E score in any of the apparatus gets the highest ranking.

In case of further equality:

5. The Team with the 2nd highest E score in any of the apparatus gets the highest ranking.

In case of further equality:

6. The Team with the highest total E score in all three apparatus gets the highest ranking.

In case of further equality:

7. In case the above procedure fails to resolve the tie:
 - a) Qualification to the final will be settled by a draw;
 - b) In the final, the tie will not be broken, and the Teams will keep their achieved ranking and receive medals as appropriate.

Championship titles - the team's total score is the sum of the final scores of all three apparatus. The winning team for each of the sections shall receive the title European TeamGym Champion.

Analysis of sports activities: 25

1. Technical evaluation of basic elements - video analyses.

Technical evaluation of basic gymnastics elements can be analyzed in certain programs for technique analysis, where skill are developed into certain segments essential for the process of proper adoption of the methodological procedure. The elements are processed by video analysis such as Kinovea, Vicon, Ariel Performance Analyses in Sport (APAS).

Motor movements in gymnastics are very complex, it is best to collect data using stereo-photogrammetric procedures that allow 3D reconstruction. Of the available photogrammetric systems, only those based on a complete image record of movement can be used. These are primarily video systems with manual determination of anatomical locomotion, under the commercial names APAS (*Ariel Performance Analysis System*), PEAK (*Video & Computer Motion Measurement System*) and SIMI MOTION (*Reality Motion System*). They have satisfactory stereophotogrammetric characteristics and the usual procedures for data processing and graphic-numerical display. The physical basis of the kinematic system consists of two functionally connected units: a video camera (signal collection) and a digitizer connected to a computer (signal processing). By projecting each frame of the video into the graphic monitor and locating the pointer, numerical values from the selected coordinate system are added to the position of the desired reference point. Three-dimensional motion analysis (3D) requires the use of two or more cameras and, accordingly, it is necessary to digitize an adequate number of reference points. .

All gymnastics discipline have their achievements measured by technical mastery, rational technique of performing gymnastic exercises, stability of motor habits, composition difficulty requirements and unique style. All exercises are determined by the “ideal” movement model. The “ideal” movement model such as gymnastics exercise technique model is determined by the biomechanical movement model (Kolar & Piletič, 2005). The biomechanical model is used in order to determine those aspects of movement, which are part of the potential success model. They can be used to set the training model of the selected exercise.

References

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SPECIAL TEAMGYM TRENING

Special Training Information: 10 hours

1. Unit training preparation (basic-mid level athletes);
2. Weekly training preparation - microcycle;
3. Monthly plan preparation - mesocycle;
4. Annual plan preparation – macrocycle.

If the training proces to be successful, in addition to the planned and systematic programing, it must also be well thought out in order to make it diverse and interesting, and this is achieved by choosing the means of training. There are to differentiate two types of training tools: tools of direct and indirect influence. The tool of direct influence are the most appropriate for the competition in terms of structure and content. Division between tools that directly affect the form of movement (technique) and the development of relevant abilities (strength). Tools of indirect influence affect the result indirectly through an increased level of strength, intensity or quality and which is related to the structure of the movement, i.e. physical exercise.

The basic tools in sports are physical exercises, which are divided into general preparatory (basic) exercises and special preparatory (competition exercises). According to Zatsiorsky & Kraemer, 2009, training can be divided into training unit, training day, microcycle, mesocycle, macrocycle Olympic-four-year cycle and multi-year cycle.

1. A training unit is an individual training session, which for high level athletes can be two or three units in a training day. The structure of the training session has four phases: Preparatory phase, Introductory phase, Main phase and Cool down phase.

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2. The microcycle includes several training days. In relation to training and competition activity, according to Petković 2002, the microcycle is divided into five different types: preparatory cycle, impact, situational, competitive cycle and recovering cycle.
3. The mesocycle is composed of several microcycles. The duration of the mesocycle is 2-6 weeks. It is suitable for sports preparations, where the technical-tactical and physical abilities of athletes are improved. According to the goal of training, mesocycles can be divided into: accumulative, pre-competition and situational.
 - Accumulative mesocycles aim to increase fitness and physical abilities of athletes;
 - The pre-competition mesocycle is introduced to increase the specific training of the athlete;
 - Situational mesocycles are used to reach the required level of physical and technical preparation of athletes.
4. The macrocycle includes the entire competitive season, i.e. includes 3 periods: pre-competition, competition and transitional period. Each training period consists of several mesocycles. Each macrocycle lasts one year.

The organization of training programs into macrocycles is called periodization. Periodization refers to the division of a training season, which usually lasts a year, into smaller interval units. The goal of periodization of the training process is to achieve the best results at major competitions. Therefore, the athlete must change training exercises, loads and methods in the pre-season and the main competition season.

The Olympic cycle includes the period of planning the training process in the next 4 years, between two Olympic cycles.

Effects of gymnastics training depends on training loads. Training load according to Petković et al. 2010. represent the functional and structural changes of the organism in adaptation to changes in the external environment. Zatsiorsky & Kraemer, 2009. indicate the existence of four groups of training loads:

- specialization (similarity of the training equipment to competitive exercise);
- directedness (influence of training exercises on motor skills);
- coordination complexity (influence on the size of training effects) and
- size (degree of exercise impact on the athlete's body).

Size of the gymnastics training load is based on the volume and intensity parameters. The volume is the total amount of training work in micro, meso and macro-cycles, which in gymnastic training is expressed as:

1. the number of performed exercises aimed at the development of basic and primary motor skills, and
2. number of movement habits performed.

The dynamics of the training load in young gymnasts is realized within the framework of two-cyclic periodization. Periodization of training, in addition to planning physical preparation, must also include a plan for technical preparation, i.e. adopting the technique of new gymnastic skills.

References

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TeamGym

SPECIAL TEAMGYM TRENING

MOTOR CONTROL, MOTOR SKILLS

2ND COACHES CAMP

MOTOR CONTROL, MOTOR SKILLS AND MOTOR LEARNING

Prospective Directions For Examining Motor Control, Motor Skills And Motor Learning: 50 hours

Introduction

The study of human movement has deep roots that extend back to ancient civilizations. Early interest in these fields can be traced to the Greeks, particularly to philosophers like Aristotle, who explored the principles of movement and mechanics (Mareš, 2022). However, systematic scientific inquiry into these areas began much later. The 19th century marked the beginning of modern biomechanics. Pioneers such as Étienne-Jules Marey and Eadweard Muybridge made significant contributions by using early photographic techniques to capture and analyze human motion. Marey's chronophotographic gun and Muybridge's sequential photographs provided visual evidence of the mechanics of movement, laying the groundwork for quantitative analysis in biomechanics (Tunstall, 2022). The early 20th century saw the emergence of motor learning and motor control as distinct areas of study. Psychologists like Edward Thorndike and B.F. Skinner began to investigate how practice and reinforcement influence skill acquisition. Thorndike's "law of effect" and Skinner's work on operant conditioning provided foundational principles for understanding how behaviors are learned and modified (Schlinger, 2022). At the same time, the field of motor control began to develop with contributions from neurophysiologists and psychologists. Sir Charles Sherrington's work

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on reflexes and the nervous system, along with Nikolai Bernstein's studies on coordination and motor variability, advanced the understanding of how movements are controlled and regulated (Shumway-Cook, Woollacott, Rachwani, & Santamaria, 2023). The mid-20th century witnessed the integration and expansion of research in motor learning, motor control, and biomechanics. The introduction of electronic devices, such as electromyography (Gardiner & Edgerton, 2014) and motion capture systems (Ennis & Chen, 2011), allowed for more precise measurement and analysis of movement.

Researchers like Paul Fitts and Richard Schmidt made significant strides in motor learning theory. Fitts' law described the relationship between speed and accuracy in motor tasks, while Schmidt's schema theory proposed a framework for how motor skills are generalized and adapted (Tükel, 2020). In biomechanics, the work of scientists like Arthur Steindler and Richard Nelson advanced the understanding of the mechanical aspects of movement. Steindler's "Kinesiology of the Human Body Under Normal and Pathological Conditions" and Nelson's research on the mechanics of sport movements became key references in the field (Atwater, 1980). The late 20th century to the present has seen rapid technological advancements that have revolutionized the study of motor control, motor learning, and biomechanics. The advent of computer simulations, advanced imaging techniques, and wearable sensors has enabled more detailed and comprehensive analysis of human movement (Klette & Tee, 2008; Wei & Wu, 2023). Interdisciplinary approaches have become increasingly prominent, integrating insights from neuroscience, psychology, physiology, and engineering (Piek, 1998). This convergence has led to the development of sophisticated models of motor behavior, improved training methods, and innovative injury prevention strategies (Abernethy, 2013).

Today, the fields of motor control, motor learning, and biomechanics continue to evolve with ongoing research and technological innovation. Current trends include the use of virtual reality and augmented reality for training and rehabilitation (Soltanabadi, Minoonejad, Bayattork & Seyedahmadi, 2023), machine learning algorithms for movement analysis (Dorschky et al., 2023), and the exploration of brain-machine interfaces for controlling prosthetic devices (Nsugbe, 2021). As these fields advance, the potential for enhancing athletic performance, optimizing training protocols, and improving overall health and well-being grows. The historical development of motor control, motor learning, and biomechanics reflects a journey from foundational principles to cutting-

edge research, with each era building upon the discoveries of the past to push the boundaries of human movement science.

Definitions

Motor learning is the process through which individuals acquire and refine motor skills through practice and experience (Magill, 2007). It involves the development of muscle memory and coordination, enabling more efficient and precise movements. Motor learning encompasses changes in the nervous system that lead to improved performance of tasks, adaptation to new conditions, and the ability to transfer skills across different activities (Fischman, 2007).

Motor control refers to the mechanisms by which the nervous system coordinates muscle activity to produce movement. It involves the planning, initiation, execution, and regulation of motor actions. Motor control integrates sensory feedback with motor commands to ensure smooth, accurate, and adaptive movements. It includes both voluntary movements, such as walking and grasping, and involuntary movements, such as reflexes (Schmidt, Lee, Winstein, Wulf, & Zelaznik, 2018).

Biomechanics in sport is the study of the mechanical principles that govern human movement and athletic performance. It involves analyzing the forces exerted by muscles and the effects of external forces, such as gravity and friction, on the body. By understanding the kinematics (motion) and kinetics (forces) of movement, biomechanics aims to improve athletic performance, enhance technique, prevent injuries, and design effective training programs (Bubanj, Bubanj, Stanković, & Đorđević, 2010).

Theoretical considerations of the problem

Motor learning and motor control are intricate processes influenced by neurologic, psychological, and biomechanical factors. Cognitive science provides a comprehensive understanding of how these elements interact to facilitate the acquisition and refinement of motor skills (Schmidt et al., 2018).

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This holistic perspective is particularly relevant in disciplines such as artistic gymnastics, where precision, coordination, and adaptability are paramount (Kılıç, 2023).

Motor learning, motor control, and biomechanics play critical roles in the development and performance of artistic gymnasts. Understanding these elements is essential to optimize training methods and enhance athletes' performance.

TeamGym for Health program focuses on improving these key areas through structured exercises and biomechanical testing.

Neurologic Approach

Brain Structures and Motor Control

Motor control is governed by several key brain structures that work in concert to plan, initiate, and execute movements:

- **Motor Cortex:** Divided into the primary motor cortex (M1) and the premotor cortex, this area generates neural impulses that control voluntary movements and plans complex motor actions.
- **Basal Ganglia:** Regulates the initiation, intensity, and smoothness of movements, playing a crucial role in selecting and inhibiting competing motor programs.
- **Cerebellum:** Fine-tunes movements, maintains balance, and coordinates timing, ensuring accuracy and smooth execution of movements.
- **Brainstem:** Facilitates basic motor activities and reflexes, acting as a conduit for motor and sensory signals between the brain and spinal cord (Uysal & Düger, 2020).

Neuroplasticity and Motor Learning

Neuroplasticity, the brain's ability to reorganize itself by forming new neural connections, is fundamental to motor learning. This process involves:

- **Synaptogenesis:** The creation of new synapses between neurons, enhancing communication within motor networks.
- **Long-Term Potentiation (LTP):** The strengthening of synapses based on recent activity patterns, essential for memory and learning.

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- **Cortical Remapping:** The reorganization of cortical maps in response to learning and experience, leading to more efficient motor control (Wenderoth, 2018).

Psychologic Approach

Cognitive Processes in Motor Learning

Motor learning involves significant cognitive components, such as attention, memory, motivation, and feedback processing:

- **Attention:** Focused attention is necessary for learning and refining motor skills, while distractions can hinder performance.
- **Memory:** Both short-term and long-term memory are crucial for retaining motor skills. Procedural memory stores learned motor patterns.
- **Motivation:** Intrinsic and extrinsic motivation influence engagement in practice, impacting skill acquisition and performance.
- **Feedback:** Intrinsic (sensory information from the body) and extrinsic (information from coaches or external sources) feedback are critical for motor learning (Kantak & Winstein, 2012; Schöllhorn, Rizzi, Slapšinskaitė-Dackevičienė, & Leite, 2022).

Psychological Theories of Motor Learning

Several theories provide frameworks for understanding motor learning:

- **Schema Theory:** Suggests that motor learning involves developing generalized motor programs, or schemas, that can be adapted to various situations through practice.
- **Dynamic Systems Theory:** Emphasizes the interaction between the individual, the task, and the environment in shaping motor behavior, viewing learning as a self-organizing process.
- **Ecological Psychology:** Focuses on perception-action coupling, highlighting the importance of environmental interaction in motor learning (Ong & Hodges, 2020).

Biomechanical Approach

Principles of Biomechanics in Motor Learning

Biomechanics examines the mechanical aspects of movement, providing insights into the efficiency and effectiveness of motor skills:

- **Kinematics:** Studies the motion of bodies without considering the forces that cause them, focusing on aspects such as velocity, acceleration, and joint angles.
- **Kinetics:** Analyzes the forces acting on the body, including internal forces (muscle contractions) and external forces (gravity, friction).
- **Load Distribution:** Investigates how forces are distributed across joints and tissues, aiming to minimize injury risk and enhance performance (Knudson, 2021).

Integration of Neurologic, Psychologic, and Biomechanical Approaches

Combining neurologic, psychologic, and biomechanical approaches offers a comprehensive understanding of motor learning and control. This integrated perspective enables the development of more effective training programs by considering the brain's role in movement, cognitive processes that support learning, and mechanical principles that enhance performance (Coker, 2017; Diekfuss et al., 2021).

In artistic gymnastics, such an approach can lead to better skill acquisition, improved performance, and reduced injury risk.

Brief Overview of Biomechanical Testing in Artistic Gymnastics

Biomechanical testing in artistic gymnastics involves analyzing the movements and physical capabilities of gymnasts to ensure that their techniques are efficient and safe. This type of testing helps identify areas for improvement and tailor training programs to enhance performance while minimizing the risk

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of injury. The data gathered from biomechanical assessments provide valuable insights into the effectiveness of training methods and the physical demands placed on athletes (Bradshaw & Hume, 2012).

Goal and Tasks of Training

The primary goal of training in artistic gymnastics is to develop athletes' technical abilities, strength, flexibility, and coordination (Petković, 2011). This is achieved through a series of well-structured warm-up exercises, training methods for basic elements, and stretching exercises. Each component is designed to prepare gymnasts for the physical demands of their routines and enhance their overall performance (Mkaouer, Hammoudi-Nassib, Amara, & Chaabène, 2018).

Warm-Up Proposals

Warm-up exercises are tailored specifically for artistic gymnasts to prepare them for their training sessions. These exercises aim to increase body temperature, improve muscle elasticity, and reduce the risk of injury. Effective warm-up routines help athletes perform at their best during training and competitions (Lima, 2018).

Training Methods for Basic Elements

The training methods for basic elements in artistic gymnastics focus on developing core skills and techniques essential for performance. These include:

Floor Exercises

Dynamic balance elements: Pirouettes, standing and hand position balance, power elements.

- Jumps, leaps, and hoops
- Acrobatic elements
- Group elements
- Flexibility elements (Mitchell, Davis, & Lopez, 2002; Readhead, 2013; Mkaouer et al., 2018)

Tumble

Basic tumble elements: Roundoff, flied, handspring, pike, tuck and straight salto (Mitchell et al., 2002; Readhead, 2013).

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Trampet (Trampoline)

Vault basic elements: Handspring forward, handspring forward with a turn (180°-360°) in the second flight phase (Readhead, 2013).

Stretching Exercises

Stretching exercises are crucial for enhancing flexibility and preventing injuries. The goal of these exercises is to improve the range of motion in the joints and the elasticity of muscles and tendons. A comprehensive stretching routine is proposed to develop both strength and flexibility in gymnasts, which are essential components for executing complex movements and maintaining overall physical health (Lima, 2018; Babault, Rodot, Champelovier, & Cometti, 2021).

Music & Rhythm Coordination Development Program

Coordination with music and rhythm is a vital aspect of artistic gymnastics. A proposed program includes exercises with music to enhance gymnasts' ability to synchronize their movements with rhythm. This program will help improved coordination, timing, and the overall aesthetic quality of gymnasts' performances (Morgado, Licursi, & Silva, 2022).

Testing Program

A well-designed program for examining motor control, motor skills and motor learning, is essential for tracking progress and identifying areas for improvement. The testing program aims to provide resource data for publishing scientific manuscripts in international journals and serve as an introduction for writing a book or monograph based on this project. This program includes detailed assessments of gymnasts' skills and physical capabilities, ensuring that training methods are effectively enhancing performance:

1. Conducting detailed assessments of motor control to understand how gymnasts coordinate and execute movements, especially during complex skills and routines. This could involve analyzing muscle activation patterns, joint movements, and coordination strategies;
2. Investigating the process of learning new skills in gymnastics, including how gymnasts acquire and refine motor skills over time. This could involve longitudinal studies tracking skill development and factors influencing skill acquisition;

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3. Examining the effectiveness of different feedback and practice strategies in enhancing motor learning in gymnasts. This could involve comparing the impact of different types of feedback (e.g., visual, auditory, tactile) and practice schedules (e.g., blocked vs. random practice) on skill acquisition and performance;
4. Studying how skills learned in gymnastics transfer to other contexts or skills. This could involve assessing the transfer of motor skills from gymnastics to activities of daily living or other sports;
5. Investigating how motor learning processes differ across different age groups of gymnasts. This could include studying how children, adolescents, and adults learn and adapt to new skills in gymnastics;
6. Exploring the use of technology, such as motion capture systems or virtual reality, to enhance motor learning in gymnastics. This could involve using technology to provide real-time feedback or create immersive training environments;
7. Examining the relationship between motor control, skill execution, and injury prevention in gymnastics. This could involve identifying movement patterns or biomechanical factors that increase the risk of injury and developing interventions to mitigate these risks;
8. Collaborating with experts from fields such as psychology, biomechanics, and sports science to gain a comprehensive understanding of motor control, motor skills, and motor learning in gymnastics.

Conclusion

Motor learning and motor control are multifaceted processes influenced by neurologic, psychologic, and biomechanical factors. Cognitive science provides valuable insights into these interactions, allowing for the development of more effective training programs. By integrating these approaches, coaches and trainers can enhance skill acquisition, performance, and overall well-being in artistic gymnastics and other sports.

In conclusion, the integration of motor learning, motor control, and biomechanics in the TeamGym for Health program is essential for optimizing training methods and improving athletes' performance. Through structured warm-up exercises, targeted training methods, comprehensive stretching routines, technical ability development programs, and music and rhythm coordination exercises, gymnasts can achieve their full potential while minimizing the risk of injury.

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MOTOR CONTROL, MOTOR SKILLS...



2ND COACHES CAMP

4health

TeamGym

APPENDIX

TEAMGYM4HEALTH – 2ND COACHES CAMP

Second Stage Sport Technique: 45 hours

Advanced TeamGym Floor Discipline – gymnasts 15-18 years old

1. Introduction and Objectives

- **Objective:** Develop precision, harmony, technical knowledge, flexibility, teamwork, and unity in the Floor discipline.
- **Key Components:** Rhythmic and choreographic elements performed to music, requiring all team members to perform together.

2. Warm-Up Strategies

Warm-ups should be done to music to enhance rhythm and coordination.

Warm-Up Activities:

1. **Running & Athletic Drills:** Running the length of the floor, diagonally crossing with stabilization exercises.
2. **Gymnastics Movements:** Walking on all fours, hopping on one leg, double leg jumps combined with stabilization exercises.
3. **Running in Circles:** Side jumps, hops, lateral movements, backward movements, combined with stabilization exercises.
4. **Dynamic Stretching:** Running with stretching in various formations, counting together (e.g., 8 seconds per stretch).

These activities aim to improve coordination with music, teamwork, synchronized steps, spatial awareness, and flexibility.



Warm-up exercises

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3. Key Skills and Techniques



Handstands

Handstands

- **Importance:** Fundamental skill worth 1.0T in routines.
- **Progression Drills:**
 1. Handstand against the wall.
 2. Handstand on beam.
 3. Handstand using bars.
 4. Handstand on soft and hard surfaces.
 5. Assisted handstand with a partner.



One - Legged Stance

Standing Balance (One-Legged Stance)

- **Focus:** Consistency in arm and leg positions.
- **Progression Drills:**
 1. Holding position with support (beam, ballet barre, wall bars, mirror).
 2. Holding position without support.
 3. Individual execution for at least 5 seconds.
 4. Execution with counting (position, hold, final stance).
 5. Rise and hold with support.



Pirouettes and
Power Balance

Pirouettes and Power Balance

- **Pirouettes:**
 - Holding position with support.
 - Turning with support.
 - 180° and 360° turns with pli .
 - Inward and outward turns.
 - Turns with leg in different positions (bent, extended forward, back, assisted by hand).



Leg swings (forward,
side, back)

Rhythmic Jumps

Types of Jumps:

1. **High-Far Jump:**
 - Leg swings (forward, side, back).
 - Hopping from one leg to another.
 - Jumping over mats.
 - Assisted jump (beam, ballet barre, mats).

- Jump with springboard.
- Independent jump execution.
- 2. **Scissor or Cat Leap:**
 - Scissors in running.
 - Leg raise and switching legs mid-air.
 - Assisted jump.
 - Jump with springboard.
 - Independent jump execution.
- 3. **Extended or Tucked Jump with Turn:**
 - Practice jumps with 180° and 360° turns as preparatory exercises for rhythmic jumps with turns.



Rhythmic Jumps



Acrobatic Elements

Acrobatic Elements Elements Required:

Two different acrobatic elements not from the same row in COP.

- **Backward Elements:** Roundoff and salto.
- **Forward Elements:** Cartwheel and salto to sit.

Team Coordination and Group Elements

- **Group Elements:**
 1. Partner, trio, and team lifts.
 2. Throwing and catching drills.
 3. Building confidence, trust, and teamwork through cooperative exercises.

Choreographic Elements

- **Choreography Development:**
 1. **Ballet Drills:**
 - At the barre and on the floor without music.
 - With music to improve rhythm and flow.
 2. **Rhythmic Jumps and Acrobatic Elements:**
 - Executed with counting (in pairs, trios, team).
 - Executed with music (in pairs, trios, team).
 3. **Formation Changes:**
 - Curving formation: dance sequences in circles, waves, etc.

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- Lateral movement: side jumps, running, cross steps, basic dance steps.
- Formation transitions: changing positions from one formation to another upon signal (initially walking, then running, jumping, and basic dance movements).

Choreography Construction:

- Assemble routines integrating all elements: rhythmic jumps, acrobatics, and group coordination.

Final Notes

- **Consistency:** Regularly update the module based on feedback and new techniques.
- **Engagement:** Keep sessions engaging to maintain motivation.
- **Professional Development:** Stay updated with the latest coaching techniques and safety protocols.

General Rules for Level B for Trampet and Vault discipline for gymnasts 15-18 years old, for both Male and Female gymnasts, with or without disabilities was adapted after TG4H first coaches camp in Bolu as International TeamGym program B. The technical difficulty defined for Level B is: Intermediate Level. The teams for level B are composed of minimum 6 gymnasts and a maximum of 10 gymnasts.

Advanced TeamGym Trampet Discipline – gymnasts 15-18 years old

- Warm-Up Activities
 1. Dynamic Stretching
 2. Cardio Drills
 3. Strength and Mobility Drills
- Main Exercises
 - Step on the trampet and perform all somersault variations (tuck, pike, straight).
 - Step on the trampet and perform perform twisting somersaults (half, full, one and a half).
 - For a half-twisting somersault, after landing the somersault on the mat, perform a jump and a half-twist step by step.

- At the end of this phase, the athlete is assisted by the coach to perform a full-twist, full and a half , two full-twists during the landing phase of the somersault.
- It is also important as a preliminary step for learning movements that will continue with running later on.
- After completing all this taxonomic development, athletes can progress from the assisted phase during the landing phase controlled by the coach to the phase where they can perform skills independently.

Advanced TeamGym Vault Discipline – gymnasts 15-18 years old

1. Introduction

- Warm-up:
 - General body warm-up (10 minutes): Repeating the warm-up exercises mentioned before light running and jumps.
 - Dynamic stretching (5 minutes): Focus on legs, elbows, wrists, shoulders, and lower back.
- Body Positions:
 - Standing posture (salto position).
 - Arm and leg coordination exercises.

2. Advanced Techniques

- Warm-up:
 - Cardio exercises (10 minutes).
 - Static and dynamic stretching (5 minutes): Focus on spine, shoulders, wrists, and legs.
- Vault Preparations:
 - Basic jumps from the trampet (jumping onto the vault with the feet).
 - Landing from the vault.
 - Correct use of knees and pointed feet and maintaining body position in the air.
 - Repeated handstand exercises on the vault table.

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- Advanced Vault Movements:
 - Basic jumps from the springboard and placing hands on the vault for Tsukahara and handspring movements.
 - Reinforcement of Tsukahara and Handspring movements on the floor.
 - Straight landing exercises.
 - Stabilization exercises.

3. Coordination and Strength

- Warm-up:
 - Speed training and interval runs (10 minutes).
 - Dynamic stretching (5 minutes): Focus on legs and torso.
- Coordination Exercises:
 - Fast running and jumping exercises.
 - Proper landing and push-off exercises.
 - Vault Table Exercises:
 - Basic handspring techniques.
 - Correct landing position after the vault.
 - Landing from a handstand (preliminary step for handspring movement).
 - Circular movement steps for Tsukahara progression.
 - Back and front salto progressions from the vault.
 - Reinforcement of salto positions.
 - Tsukahara movement leading to a backfall onto the mat.
 - Backward roll into a salto as a preliminary step for the salto movement.

4. Technique Development

- Warm-up:
 - Coordination exercises (5 minutes).
 - Flexibility exercises (10 minutes).
- Strength and Explosiveness Exercises:
 - Core and upper body strengthening.
 - Speed and explosive jump exercises.

- Vault Application:
 - Advancement of handspring movements.
 - Half-turn salto (landing on back) and full-turn landing on feet exercises.
 - Twisting salto progressions. Half-twist front salto and full-twist front salto.
 - Twisting back salto progressions. Half-twist back salto and full-twist back salto.

Identification of conditional characteristic

Performance in Artistic gymnastics depends on the level of physical fitness and complex technical skills requirements. Gymnasts must achieve high strength, flexibility, and coordination levels to effectively perform the wide range of complex acrobatic skills (2-5). Bencke et al. (2002) indicated that gymnastic athletes develop better lower limb strength indices at an early age compared with practitioners of other sports (football, swimmers, basketball). Because of that 11-year-old male gymnasts were stronger than their untrained peers. A long-term gymnastics training has various effects depending on the type of strength indices (rate of force development, maximal, relative and absolute force) (6) as well as the particular muscle groups (lower and upper limbs) (7). Many researchers showed a higher rate of force development in young gymnasts compared to their untrained peers. Talent identification is a fundamental process in the pursuit of sports performance excellence (8). In artistic gymnastics some programmes of talent identification are emerging in leading countries (e.g., International Gymnastics Federation [FIG] Age Group Development Programme, USA Gymnastics TOPs programme, Gymnastics Functional Measurement Tool [GFMT], and World Identification Systems for Gymnastics Talent [WISGT]).

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Motoric tests

The most accepted programmes used by coaches and researchers are those of the International Gymnastics Federation and the USA Gymnastics (1-5). The training and talent identification programme of the International Gymnastics Federation “FIG MAG/WAG Age Group Development Program” (8-9) presents the basic approach adopted to develop young gymnasts’ physical fitness (strength, flexibility, power, and endurance). This programme is currently adopted by FIG international coaches for young (6-11 years) and 18 year old gymnasts. Gymnasts must be prepared over several years to sustain and develop their physical fitness performance required to succeed in competition. The FIG is working very seriously to improve and update gymnastics training and talent identification programme. One of the main missions of FIG is to organise education courses for coaches to improve their knowledge and effectiveness in physical, technical, and psychological preparation, without causing harm to gymnasts’ health. Many national gymnastics federations use these programs with recommended standards for the physical and technical

preparation of gymnasts at a certain age, so that they can compete in the International program prepared by FIG.

FIG MAG and WAG Age Group Development Program was developed to introduce coaches how to learning from these training sessions. This effort should be concentrated on essential aspects:

- A systematic increase of the loads with the purpose to create a long term and lasting load ability of the support and motor system,
- A high development of the prerequisites (flexibility, power, basic structures) to limit the negative load effects of high repetitions of movement and faulty techniques (inefficient position of the joints).

The goal of Long Term Performance Planning is to create prerequisites (flexibility, power, basic technical structures), that are necessary for a stable and continuous increase of the specific performance. Purpose of the Physical AbilityTesting Program (PAT) is:

- The PAT shows what the demands are for the development of the flexibility and power skills;
- The selection of test exercises is based on experiences over many years and is an extract from training programs for the development of the physical ability prerequisites for performance;
- The test exercises for flexibility are focused on the level of development of the passive and active flexibility of the hips and shoulders;
- The test exercise of the power skills are based on the determination of the level of development of the explosive power (arms and shoulder, legs and core strength), the special power endurance, and the level at static and dynamic components of exercises.

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Exercise 1 - Low V-Sits



Exercise 2 - V-Sits



Exercise 3 - Lower back arches



Exercise 4 - Pike rotation



Exercise 5 - Hollow body rock



Exercise 6 - Superman rock

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Training Session Plan

Training session planning has many advantages, especially when looking at long-term performance planning. Without plans, you could face some difficulties:

- No progression – it's difficult to show improvement and build on each session if you don't plan ahead;
- No reference point for the future – it's rewarding to see how far someone has come;
- No focus – plans help you identify areas you need to focus on. Without a plan, your training may not help attendees develop their skills.

TeamGym is new discipline to most of our project partners and that is why we need to learn coaches how to do Training session plan. These are examples that will be used for education sessions of new teamgym coaches (Appendix).

Responsibilities for Coaches: 10 hours

1. „Trainer to trainer“ approach

In TeamGym the titles of **coach** and **trainer** are typically used. Both sinonims generally teach gymnastics at recreational or competiton level. Coaches instruct, guide, and prepare athletes for gymnastics competition. The basic task of gymnastics coaches and trainers is to teach and help gymnasts to learn new skills. TeamGym discipline is specific as a group sport, so we have more than one trainer. The specificity of this discipline is teamwork, where each coach has his own methodology for working on a specific discipline. Later, that teamwork comes to its overall expression through the display of achievements at TeamGym competitions. Mutual assistance and coordination in work is inevitable, because this is the only way to achieve success in this discipline.

Working together with other coaches has its advantages. As a coach you're responsible to providing a safe physical environment and to minimize the risk of injury. You'll communicate not only with your athletes and their parents but also with fellow coaches, officials, administrators, and others. Communicate in a positive way that demonstrates you have the best interests of the gymnasts. Teaching the fundamental skills of gymnastics has their point to make sure that gymnasts are always having fun. To help young gymnasts improve their skills, you need to have an understanding of gymnastics skills, progressions and technique. This understanding is easier when several coaches work together to learn and motivate gymnast to continue learning process.

2. Coach-athlete relationship

Coach or Trainer is act of coaching athlete to became successful in discipline. If you as a trainer wants to be liked, favorite with children and in the same time and successful coach, you'll need five tools, according to American Sport Education Program (ASEP) and USA Gymnastics. These tools are personality traits that a coach must not ignore during his career. Personality traits can through self-examination remember and look for the opportunity to master these characteristics that children like in coaches during training. Effective coach can remember these traits thry acronim COACH:

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- C Comprehension,
- O Outlook,
- A Affection,
- C Character,
- H Humor.

Comprehension of the rules and skills of gymnastics is required. You must understand the elements of the sport. To improve your comprehension of gymnastics, every trainer must read about fundamental skills of gymnastics, competition rules, new compulsory elements and exercises. He needs to take coaching education courses, and attend gymnastics coaching workshops, watch gymnastics events on television, local youth, college, and high school gymnastics events. Trainer must implement proper training and safety methods that gymnasts can participate with lower risk of injury. Finally, the training goal is to provide fun and cheerful practices but also and effective.

Outlook refers to your perspective and goals, what you seek as a coach. The most common coaching objectives are to have fun; to help athletes develop their physical, mental, and social skills; and to strive to win. Your outlook has to involve your priorities, your planning, and your vision for the future. Athletes must be first, and then result to win.

Affection is a genuine concern for the young people you coach. This requires having a passion for kids, to share with them your enjoyment and knowledge of gymnastics. You can demonstrate your affection in many ways, such as: making an effort to get to know each athlete on your team, treat each athlete as an adult individual, help athlete to learn new and difficult skills, treat athletes as you would like to be treated under similar circumstances, keep positive tone in all of your communications.

Character is very important and necessary to have when you work with young athletes, because the character and persistence you have young athlete can develop a similar character as a role model to their coach.

Humor means having the ability to laugh at yourself and with your athletes during practices and competitions. Allow yourself and your athletes to enjoy the ups, and downs, because training should make practices fun, including a variety of activities, that which do not need to be difficult to learn. One of good tool is „smile“ on training.

Injury prevention

Gymnastics injuries can be defined as any damaged body part that would interfere with training (Nojes, Liinderfeld & Marshall, 1988; Sands, Shultz & Newman, 1993; Sands, 2000a). Most gymnastics injury are skill-specific. According to Caine & Maffulli, 2005. injuries tend to occur more frequently during the early part of training when exercise are not jet learning to a final skills. After vocation time or before competition when new skill is performing injury can increase (Kerr & Minden, 1988; Sands, 200a; Marshall et al, 2007). Gymnasts can often step on a mat and sprain an ankle, or they can jump or land so ankle ligaments suffer or it can cuseess tissue damage. Injury can be acute or chronic (overuse). Many researches have written that gymnasts continue to train and afteractive injury (Aldridge, 1991; Caine & Neassar, 2005; Sands, McNeal & Stone, 2011). Frequency of injuries in gymnastics refers to incidence of stress fractures (Vain, 2002; Flynn, Ughwanogho & Cameron, 2011; Hume 2010-2014), soft tissue damage such as the Achilles tendon (Wertz, Galli & Borchers, 2013; Leglise & Binder, 2014). Gymnasts fractures are common in the:

- radius and wrist (Caine et al, 1992; DiFiori et al, 1997),
- spine (Wade et al, 2012; Brady & Vincenzino, 2002; Caine & Nassar, 2005; Flynn, Ughwanogho & Cameron, 2011),
- elbow (Chan et al, 1991; Farana et al, 2015), and
- clavicle (Fallon & Fricker, 2001; Fujioka et al, 2014).

Modern gymnastics is too dangerous to practice without coach or supervisor. Key factors of gymnastics succsess may be physical and psychological factors. Depending on the degree of applicability of these factors, the frequency of injuries occurs. Most injuries occur during the training process. Training loads are very important for the gymnasts physical preparation, although progression in gymnastic learning new complex skills depends on it. There are few studies for monitoring training loads in gymnastics (Caine & Nassar, 2005; Sartor et al, 2013; Westermann et al, 2014). Modern concept of periodization with their principles were explored in gymnastics training (Arkaev & Suchilin, 2004; Jemni & Sands, 2011) and coaches in all gymnastics disciplines schould use periodization principles to reduce the incidence of injuries.

It is also believed that training conditions lead to injuries. Modern training gymnastics halls with modern equipment can reduce the risk of injuries in the

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process of learning complex gymnastics exercises. Among injury prevention equipment are different landing mats, air bag mats, landing pit, foam pit, foam blocks. Dunn, 1980, e noticed that in gymnastics training the role of the spotter coach is very specific and important. Spotting requires considerable skill on the part of the coach and clear communication between coach and athlete (George, 1988 a,b). Primary goal of spotting is to prevent gymnasts from falling on head or neck. There is understanding that if skill goes wrong during the motion, the coach spotter should keep the athlete. Catching the falling gymnasts requires motor control principles of reaction and movement time, going through a:

- *Stimulus identification stage* – involves perceiving the gymnasts and the situation. Duration of these stage is influenced by clarity and magnitude of various stimuli (Sands, 1996, Schmidt, 1988);
- *Response selection stage* – processing a perceived information developed a rule called Hick-Hyman Law, which indicates that for every doubling of potential response reaction time increases by fixed duration (Sands, 1996, Schmidt, 1988, 1994; Schmidt & Stull, 1970) and
- *Response programming stage* – the more complex response programming is, the longer these stage requires.

Injuries in the TeamGym discipline are rare but not uncommon. As with gymnastic sports, they can apply:

- general injuries, - foot and ankle injury,
- lower and upper leg injury, and - spine, low back, hip and pelvis.

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Analysis of Sport Activities: 15 hours

1. Verbal and nonverbal massages
2. Video resource for coaching skills

1. Verbal and nonverbal massages

Theoretical and practical aspects of teaching and learning gymnastics skills provides the ability to explain academically acquired knowledge and its practical applicability to learning motor skills. According to Jemni & Sands, 2018. gymnastics is all about skills. Gymnastics perform skills, they are mesured by their ability to perform a serial of skills that they performed a hunderds of time in the past. Gymnastics preparation begins with physical preparation (Sands, 1990b), followed closely with technical, tactical, psychological and theoretical aspects of readiness. The gymnast needs strength, speed, stamina, flexibility and power before the other aspects (Bompa, 1990; Sands, 1990a). If the gymnast cannot produce force and position required by the skills, he has to work primarily on fitness. While learning new skill gymnast will make many errors, many of them will be uncomfortable and maybe dangerous. „It is in the process of technical preparation that the educational ability of the coach and his professional qualifications as a gymnastics teacher especially come out vividly“ (Arkaev & Suchilin, 2004, 125).

Motor learning tends to pass trough three stage: the cognitive stage, associative and autonomous stage (Schmidt, 1988) or initial, intermediate and advanced (Helsband & Lange, 2006). Cognitive stage begins with learning a new skill, when gymnast watch demonstration of that skill, listen a description from coach and talk about it to understand movement pattern. The associative stage involvs many separate tries to perform skill, with movements wich is correct or incorrect. The third stage is when skill is learning so well that become automatic process with no cognitive intervention.

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Identification of errors while new gymnastics skill is learning involves feedback. Feedback is defined as perceived sensory information regarding a movement. Feedback can be **Intrinsic**, when information obtain from coaches comments, video images or watching onself, and **Extrinsic**, wich ususlly serves as a motivator. Feedback usually involves identification of errors, but all errors are not equal. Transfer of learning tasks to a final skill is becoming a gymnastic exercise. Positive and negative transfer in motor skills finds inportant role in efficient learning.

2. Video resource for coaching skills

Video analysis in sports has become a powerful tool for performance improvement and strategic planning. It provides detailed insights that help athletes and coaches to make decisions, enhancing training and tactics. Video analysis can provide analysis of matchplay, athlete movements, strategies, video analysis has changed the way coaches and athletes refine their craft. This modern technology not only propels teams towards excellence but also demystifies the complexities of sports for enthusiasts and professionals alike. This process involves capturing game or practice footage and using specialized software to analyze the visuals, often in slow motion or frame by frame, to gain insights that are not visible in real-time.

Video analysis in TeamGym enables coaches and athletes to dissect individual performances, focusing on technique, decision-making, and physical movements. All gymnasts can see firsthand what adjustments need to be made to improve their skills, from minor technique tweaks to major strategic overhauls. In recent years, video analysis has been used in judges evaluations in order to objectively evaluate the performance technique and the aesthetic component of all gymnastics disciplines.

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Special Training Information: 20 hours

1. Unit training preparation (training load)
2. Weekly training preparation
3. Monthly plan preparation
4. Annual plan preparation

1 Unit training preparation - training load

Young gymnasts have training programs higher in volume and intensity than other sports for children of similar age (Burt et al, 2010). Training load in gymnastics is typically quantified by assessing weekly hours of gymnastics specific training. More research is needed to determine the type and magnitude of gymnastic-specific loading relative to non-elite or national level gymnasts. In addition to reporting training load through weekly exposure, many gymnastics skills have been analysed to determine the specific impact loading on the skeleton.

Phases of training, also known as periodised training typically consist of three phases; reparation, competition and transition (Bompa & Carrera, 2005). Gymnastics coaches are encouraged to follow periodised training programs for all aspects of the sport in order to prevent and minimise the risk of injury, optimise peak performance, and ensure adequate preparation and recovery (Brooks, 2003).

Training load differences were evident between participation level, hours of training and the frequency of observed gymnastic-specific skills. For gymnastic specific movement patterns, international level gymnasts generally recorded higher frequency of observed movements within a standardized 30 minute training period. Participation level also had a major influence on all gymnastic-

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specific skills and training phase. Overall training load is higher for international than national level gymnasts. International gymnasts are exposed to ground reaction forces up to 14 times body weight (Panzer, 1987) and train 26 hrs.wk-1. Female national gymnasts are typically exposed to forces up to 10 times body weight (Daly et al., 1999) and train 14 hrs.wk-1.

2 Weekly training preparation

Weekly training preparation depends of several factors: total training time, effective training time, the number of approaches to the discipline, pause between disciplines and within exercises. A microcycle includes several training days. The microcycle in the preparatory period usually lasts seven days.

Total training time - the shortest training unit is 90 min, while the total training time, depending on age and quality, ranges from 90-300 min/week.

Effective training time needs to be monitored because 20-30% of the total time is considered a very good training performance, and this is achieved by good organization of the training unit.

The number of approaches to a discipline implies the number of performed exercises in each discipline. This belongs to the control that most reliably speaks about the overall sports form. Training load is the most significant indicator of an athlete's readiness, and with the decrease in the number of performed exercises, the load must increase.

Pause between disciplines and within exercises that the athlete does can be reduced and make the training more efficient.

During training preparation every coach should take into account the athlete's mood, motivation, sleeping time, hydration and nutrition or weight loss.

3 Monthly plan preparation

Monthly plan preparation of the athlete or the team depends on the preparation of the mesocycle. The mesocycle is made up of several microcycles. mesocycle lasts from 2-6 weeks, usually 4 weeks, so it is taken as a monthly preparation plan of athletes. According to Zatsiorsky & Kreamer, 2009. mesocycle can be divided into accumulative, pre-competitiv and situational.

The accumulative mesocycle aims to improve motor skills and sports technique. The results of the accumulative mesocycle are evaluated on the basis of testing, i.e. motoric measurement. The pre-competitive mesocycle is

introduced to increase the non-specific physical form in the specific training of the athlete. In this period, specific exercises of the sports discipline are used to improve sports form and technique. The situational mesocycle is intended for achieving the best sports performance, which is evaluated by the result at the competition.

4 Annual plan preparation

Annual plan preparation consists of two macrocycle. Each macrocycle consists of several mesocycles. One macrocycle includes the competitive pre-season. In Europe, these periods are called preparatory, competitive and transitional periods. The plan for the annual training process is 52 weeks. The coaches must keep records and enter the elements indicating the physical, technical, tactical, psychological, sociological and all relevant factors for athletes, such as:

1. General and specific characteristics of the team or individual, which should be entered in the physical preparedness column (the coach enters the general and special indicators of FP and their level required for the successful implementation of the plan);
2. Technical preparedness, which is reflected both in the achieved average result last year, the planned average this year, and in the number and structure of difficulty requirements (B, C, D and E difficulty elements) for the competition program to be implemented;
3. In the section tactical preparation of gymnasts, when it comes to the team, a plan is drawn up for the best 5 gymnasts (or 7 - 10, which depends on the number that makes up the team) so that the best in the discipline in question will contribute to the success of the team;
4. The psycho-social characteristics of the team and the individual involve writing these characteristics for each individual from the team (reliable in the competition and “kickers”, “hardworking” and “lazy”, “timid” and “brave”, “leaders”, poor and rich etc.);
5. Other indicators include: absences, injuries, illness, etc.

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APPENDIX

In the Table below are the responses of the participants of the First Camp for TeamGym coaches, which was held in the city of Bolu (Turkey). The questions were direct and the answers we received were very satisfactory.

Time	1. How adequate was the duration of the training course?	2. How relevant was the training content to your needs?
9.2.2024 20:01:44	Very adequate	Quite relevant
9.2.2024 20:21:08	Very adequate	Somewhat relevant
9.2.2024 20:50:46	Very adequate	Quite relevant
9.2.2024 20:51:51	Very adequate	Quite relevant
9.2.2024 22:01:58	Very adequate	Quite relevant
9.3.2024 0:54:41	Very adequate	Quite relevant
9.3.2024 9:43:28	Very adequate	Somewhat relevant
9.3.2024 9:44:06	Very adequate	Very irrelevant
9.3.2024 10:08:45	Neutral	Very irrelevant
9.3.2024 11:06:10	Somewhat adequate	Quite relevant
9.3.2024 11:35:25	Very adequate	Quite relevant
9.3.2024 11:53:30	Very inadequate	Very irrelevant
9.3.2024 12:42:32	Very adequate	Quite relevant
9.3.2024 18:37:28	Neutral	Somewhat relevant
9.4.2024 12:10:36	Very adequate	Quite relevant
9.4.2024 21:11:12	Very adequate	Quite relevant
9.5.2024 7:55:31	Very adequate	Quite relevant

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Time	3. Were the facilities adequate for implementing the training course activities?	4. How would you rate the methodology of the training course?
9.2.2024 20:01:44	Very adequate	Excellent
9.2.2024 20:21:08	Very adequate	Average
9.2.2024 20:50:46	Very adequate	Excellent
9.2.2024 20:51:51	Very adequate	Excellent
9.2.2024 22:01:58	Very adequate	Excellent
9.3.2024 0:54:41	Very adequate	Good
9.3.2024 9:43:28	Very adequate	Good
9.3.2024 9:44:06	Very adequate	Excellent
9.3.2024 10:08:45	Very adequate	Good
9.3.2024 11:06:10	Very adequate	Excellent
9.3.2024 11:35:25	Very adequate	Excellent
9.3.2024 11:53:30	Very inadequate	Excellent
9.3.2024 12:42:32	Very adequate	Excellent
9.3.2024 18:37:28	Somewhat adequate	Good
9.4.2024 12:10:36	Very adequate	Excellent
9.4.2024 21:11:12	Very adequate	Excellent
9.5.2024 7:55:31	Very adequate	Good

Time	5. Do you feel sufficiently prepared to deliver TeamGym training to after this course?	6. Do you feel the need for additional training regarding TeamGym?
9.2.2024 20:01:44	Very prepared	Neutral
9.2.2024 20:21:08	Somewhat prepared	Agree
9.2.2024 20:50:46	Very prepared	Agree
9.2.2024 20:51:51	Extremely prepared	Disagree
9.2.2024 22:01:58	Extremely prepared	Neutral
9.3.2024 0:54:41	Very prepared	Agree
9.3.2024 9:43:28	Very prepared	Agree
9.3.2024 9:44:06	Very prepared	Neutral
9.3.2024 10:08:45	Very prepared	Neutral
9.3.2024 11:06:10	Extremely prepared	Neutral
9.3.2024 11:35:25	Very prepared	Neutral
9.3.2024 11:53:30	Very prepared	Neutral
9.3.2024 12:42:32	Extremely prepared	Strongly agree
9.3.2024 18:37:28	Somewhat prepared	Agree
9.4.2024 12:10:36	Very prepared	Agree
9.4.2024 21:11:12	Very prepared	Disagree
9.5.2024 7:55:31	Extremely prepared	Neutral

Time	7. Overall, how useful did you find the training course?	8. How well was the organisation of training course?
9.2.2024 20:01:44	Very useful	Very high quality
9.2.2024 20:21:08	Very useful	Good
9.2.2024 20:50:46	Very useful	Very high quality
9.2.2024 20:51:51	Extremely useful	Very high quality
9.2.2024 22:01:58	Very useful	Very high quality
9.3.2024 0:54:41	Very useful	Very high quality
9.3.2024 9:43:28	Very useful	Good
9.3.2024 9:44:06	Extremely useful	Good
9.3.2024 10:08:45	Extremely useful	Very high quality
9.3.2024 11:06:10	Extremely useful	Very high quality
9.3.2024 11:35:25	Very useful	Very high quality
9.3.2024 11:53:30	Extremely useful	Very high quality
9.3.2024 12:42:32	Extremely useful	Very high quality
9.3.2024 18:37:28	Very useful	Good
9.4.2024 12:10:36	Extremely useful	Very high quality
9.4.2024 21:11:12	Very useful	Very high quality
9.5.2024 7:55:31	Very useful	Very high quality

Time	11. How effective was the workshop in introducing TeamGym?	12. How active were you in the workshop?
9.2.2024 20:01:44	Very effective	Very active
9.2.2024 20:21:08	Moderately effective	Very active
9.2.2024 20:50:46	Extremely effective	Moderately active
9.2.2024 20:51:51	Extremely effective	Extremely active
9.2.2024 22:01:58	Extremely effective	Very active
9.3.2024 0:54:41	Very effective	Very active
9.3.2024 9:43:28	Extremely effective	Moderately active
9.3.2024 9:44:06	Extremely effective	Extremely active
9.3.2024 10:08:45	Very effective	Very active
9.3.2024 11:06:10	Extremely effective	Extremely active
9.3.2024 11:35:25	Extremely effective	Moderately active
9.3.2024 11:53:30	Extremely effective	Extremely active
9.3.2024 12:42:32	Extremely effective	Extremely active
9.3.2024 18:37:28	Very effective	Moderately active
9.4.2024 12:10:36	Extremely effective	Extremely active
9.4.2024 21:11:12	Very effective	Extremely active
9.5.2024 7:55:31	Extremely effective	Very active

TeamGym4Health Educational Methodology

Time	13. To what extent did the workshop attract the interest of local people?	14. Overall, how useful was the local workshop?
9.2.2024 20:01:44	Greatly	Very useful
9.2.2024 20:21:08	Slightly	Moderately useful
9.2.2024 20:50:46	Greatly	Extremely useful
9.2.2024 20:51:51	Greatly	Extremely useful
9.2.2024 22:01:58	Greatly	Very useful
9.3.2024 0:54:41	Greatly	Very useful
9.3.2024 9:43:28	Greatly	Very useful
9.3.2024 9:44:06	Extremely	Extremely useful
9.3.2024 10:08:45	Greatly	Very useful
9.3.2024 11:06:10	Extremely	Extremely useful
9.3.2024 11:35:25	Greatly	Very useful
9.3.2024 11:53:30	Extremely	Extremely useful
9.3.2024 12:42:32	Extremely	Extremely useful
9.3.2024 18:37:28	Greatly	Very useful
9.4.2024 12:10:36	Greatly	Very useful
9.4.2024 21:11:12	Greatly	Very useful
9.5.2024 7:55:31	Greatly	Very useful

Time	15. How well was the organisation of training course
9.2.2024 20:01:44	Very high quality
9.2.2024 20:21:08	Good
9.2.2024 20:50:46	Very high quality
9.2.2024 20:51:51	Very high quality
9.2.2024 22:01:58	Very high quality
9.3.2024 0:54:41	Very high quality
9.3.2024 9:43:28	Good
9.3.2024 9:44:06	Very high quality
9.3.2024 10:08:45	Good
9.3.2024 11:06:10	Very high quality
9.3.2024 11:35:25	Very high quality
9.3.2024 11:53:30	Very high quality
9.3.2024 12:42:32	Very high quality
9.3.2024 18:37:28	Good
9.4.2024 12:10:36	Very high quality
9.4.2024 21:11:12	Good
9.5.2024 7:55:31	Very high quality

TeamGym Training Session Plan (template)

1. Session Title

Provide a clear and specific title that aligns with the annual training plan.

2. Session Objectives

Define the key goals of the session within the context of the yearly training process.

3. Session Structure

Outline the structure of the session, including time allocations for each segment.

4. Warm-up Activities

Provide a list of warm-up activities to prepare the athletes for the session.

5. Main Training Activities

Specify the primary exercises and techniques to be taught.

6. Cool-down Activities

Detail cool-down exercises to promote recovery and prevent injury.

7. Materials and Equipment

List all materials and equipment required for the session.

8. Safety Considerations

Highlight safety measures to ensure a secure training environment.

9. Evaluation and Feedback

Specify methods for assessing the session's effectiveness.

- Provide real-time feedback during drills and routines.
- Use progress tracking sheets to document improvements.
- Gather verbal feedback from athletes post-session.

TeamGym4Health Educational Methodology

10. Additional Notes

Add supplementary information or reminders.

TeamGym Progress Tracking Sheet

Instructions

Use this progress tracking sheet to evaluate athlete performance during each training session. Document progress in skill development, note areas needing improvement, and track overall achievements over time.

Session Information

Session Title: _____

Date: _____

Coach: _____

Athletes: _____

Objective(s): _____

Main Training Activities

- Activity: _____

- Skill Focus: _____

- Athlete Performance:

- Athlete 1: Excellent [] Good [] Needs Improvement []

- Athlete 2: Excellent [] Good [] Needs Improvement []

Progress Summary

- Overall Skill Progress:

- Athlete 1: Excellent [] Good [] Needs Improvement []

- Athlete 2: Excellent [] Good [] Needs Improvement []

- Notes on Areas for Improvement: _____

- Next Steps for Training: _____