

# PRACTICAL GUIDANCE

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## Purpose

SKISAFE Practical guidance is a brochure with guidelines, suggestions, and good practices in safety and health of young alpine ski racers. In this practical guidance alpine skiing coaches can find general guidelines on physical strength and conditioning, nutrition and hydration, ski tuning and equipment check, venue safety, and coaches' general communication.

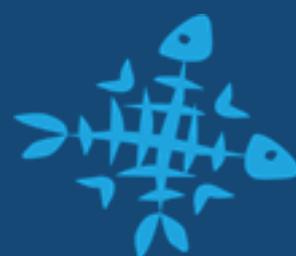
Practical Guidance has been issued as result of implementation of SKISAFE Erasmus+ Sport project during 2021/2022, based on the long term practical experience of Ski Klub Rijeka.

The goal of SKISAFE Practical Guidance is to teach, remind, and help all the subjects participating in alpine skiing training and racing processes, minimizing the risk of injuries, specifically to keep alpine skiing activities healthy and attractive for children and young athletes.

As a first issue, this brochure has a chance to become the manual open for permanent new improvements implemented in ski coaches' practice.



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## Partner organizations

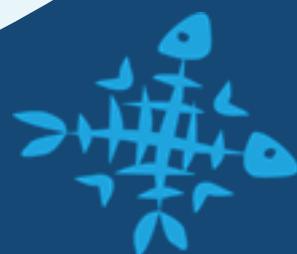
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ski klub Rijeka

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## PROJECT SUMMARY

The goal of the SKISAFE project is to protect young ski athletes in age range from 10-14 from health and safety hazards. The practical guidance brochure is aimed as a non-formal educational material for alpine skiing coaches and the wider skiing community. Influenced by the environment, which includes coaches, families and the media, young athletes are expected to have superior results inappropriate for their age and ability. Under such pressure and the overloaded training process, injuries are very common. In skiing, additional injuries are possible given the specific elements of the sport that require maximum safety checks and the use of quality equipment.

The concept of this project is to ensure that coaches and sports trainers are educated on the importance of protection of the youngest athletes on the areas of the health and safety risks. To improve training and conditions we put the accent also on safety equipment and practice for prevention of injury. Coach should expertly check grounds and facilities. Attention to detail during checks, reports and monitoring are key strategies that sport clubs and coaches need to put into practice. This project helps professionals to analyze good practice examples, exchange experiences, prepare educational materials, and organize practical workshops on the ski slopes.



## PHYSICAL STRENGTH AND CONDITIONING

### THE MAIN GOALS OF STRENGTH AND CONDITIONING TRAINING:

- ✓ Injury prevention
- ✓ Flexibility and mobility
- ✓ Developing basic motoric skills
- ✓ Balance
- ✓ SAQ and plyometric capabilities
- ✓ Cardiovascular capacity training
- ✓ Repetitive muscle strength

During the strength and conditioning preparation season, usually focused on in the summer, coaches' priority is to get the youth athletes strong, balanced and ready for the upcoming alpine ski racing season. The goals above are crucial for the athlete to succeed in injury prevention and maximizing performance on snow.

### INJURY PREVENTION

Skiing is excessively physically demanding sport where injuries occur often, even with well-prepared and seasoned athletes. Lack of movement, flexibility and mobility in joints and muscles can be described as some of the main reasons for athlete body injuries. Thus, only a well programmed strength and conditioning training can boost the athlete capabilities and prevent injuries. It is a strength and conditioning coaches' objective to provide safe, professional, and kinesiology approved training plan for youth athletes.

### FLEXIBILITY AND MOBILITY

The imperative of flexibility and mobility should be kept in mind at all times, as it significantly decreases muscle and tendon injuries if performed well and before every training. Some of the findings and good practices in this field include:

- ✓ Proper warm-up procedure with playful and fun elements
- ✓ Static and dynamic flexibility exercises (amplitude awareness)
- ✓ Mobility – consult with physiotherapist and doctor if there is a deficiency
- ✓ Lack of flexibility and mobility often results in injuries

### DEVELOPING BASIC MOTORIC SKILLS

Basic training elements coaches use to boost performance in athletes' basic motoric skills:

- ✓ **Track and field training** (running drills, jumping, ladder, etc.)
- ✓ **Gymnastics** (front roll, handstand, trampoline, etc.)
- ✓ **Swimming** (breathing control, coordination upper-lower body)
- ✓ **Ball games** (soccer, volleyball, basketball, etc.)
- ✓ **Water sports** (water skiing, wakeboard)
- ✓ **Inline sports** (roller skating, roller hockey, etc.)



### BALANCE TRAINING

One of the most important skills an alpine skier possesses is balance accompanied with agility. It is important to state that the youth skiers need slow progression in balance exercises in order to master in performance. A good example of balance progression and safety regression (if necessary) is static to dynamic cycle.

STATIC EXERCISE EXERCISE	→	PROGRESSION	→	DYNAMIC
Standing on a roller roller	→	Progression	→	Squats on a
Squats on a roller	→	Safety regression	→	Roller on a mat

### SPEED-AGILITY-QUICKNESS AND BASIC PLYOMETRICS

Young athletes usually enjoy SAQ and plyometrics training due to entertainment, competition and coordination challenges during the exercises. Some of the good practices to organize a productive SAQ and plyometrics training include:

- ✓ Pick a spacious venue such as indoor hall or a soccer field
- ✓ Be aware of the surface – avoid pavement or other hard surfaces
- ✓ Prepare multiple elements for athletes to develop performance planning skills
- ✓ Make the elements entertaining, playful and achievable for everyone
- ✓ Make the training competitive for the athletes to develop competitiveness

### CARDIOVASCULAR CAPACITY TRAINING

Athletes require a high cardiovascular capacity in order to perform well on the ski slopes and maintain fatigue to prevent injuries. Some of the good practices of well-prepared youth alpine skiers include:

- ✓ **Running**
  - Short to medium distance only
  - Preferred surfaces are tartan track, grass, gravel, etc.
  - Avoid running on pavement and other hard surfaces
- ✓ **Cycling**
  - Road cycling on low traffic roads
  - Mountain biking on easy forest trails
- ✓ **High altitude training** (2.100m+ above the sea level)
  - Mountaineering on easy to medium trails
  - Running on the mountain trails

### REPETITIVE MUSCLE STRENGTH

Muscle strength training is among the most dangerous and often results in injuries in youth athletes if not planned and performed well. Thus, coaches need to put in the maximum caution while giving the exercises to youth athletes. Some of the good practices in this field include:

- ✓ Perform bodyweight training – avoid weight training
- ✓ Perform light medicine ball exercises
- ✓ Perform core activation before every training
- ✓ Perform exercises in a neutral spine posture



## NUTRITION AND HYDRATION

**Dehydration** is a condition when the body loses more water than it takes in.

In adults and adolescents, a loss of 2 % body weight in fluids has been shown to have adverse effects on performance and lead to injury. In children, those same negative effects are thought to occur sooner, with just 1% decrease in body weight.

At high altitudes breathing losses due to humidification and heating of inhaled air of low relative humidity can be more than 1 L / day; relative humidity of exhaled air is 100%.

### BENEFITS OF STAYING HYDRATED INCLUDE:

- ✓ Improved muscle function.
- ✓ Regulated blood pressure.
- ✓ Improved circulation.

Staying hydrated also improves blood flow and circulation and thus the delivery of oxygen and nutrients to working muscles. Good hydration also helps remove metabolic by-products and waste from muscles, while replacing the water that is lost through sweat.

### HOW CAN PROPER HYDRATION HELP YOUNG ATHLETES REDUCE INJURY RISK?

- ✓ Dehydration contributes to muscle fatigue, which can increase the risk for injury.
- ✓ Staying hydrated is essential for thermoregulation, helping to prevent cramps, heat exhaustion and heat stroke.

#### Early signs of dehydration include:

Fatigue  
Nausea  
Headache  
Apathy  
Irritability  
Thirst  
Muscle cramping  
Weakness

#### Signs of advanced dehydration include:

Dark urine  
Dry lips and mouth  
Decrease in reaction time  
Irritability  
Nausea  
Headache  
Apathy  
Disorientation



**Injury risk**  
**Reduced performance**



## HOW TO DETECT DEHYDRATION?

- ✓ **Thirst:** using a scale of one to nine, with one being not thirsty at all to a nine being very, very thirsty, researchers have found that young athletes falling between a three and five likely had a 1 to 2 % dehydration.
- ✓ **Urine Color:** charts have been developed to help young athletes know when they are dehydrated. Ideally, young athletes want their urine color to be a pale yellow (like fresh-squeezed lemonade or lemon juice), indicating adequate hydration. A strong yellow, orangey-yellow or brownish green color means the athlete is dehydrated.
- ✓ **Weight:** A pre- and post-exercise body weight is another method for identifying dehydration.

## STRATEGIES TO STAY HYDRATED

American Academy of Pediatrics (AAP) set guidelines for fluid consumption during exercise for youth as follows:

1. Children should have appropriate fluid replacement available.
2. They should consume fluids at intervals before, during and after exercise.
3. 9 to 12-year-old children should replenish with 90 to 240 ml (1 conventional glass 200 ml or 250 ml, 1 conventional bottle 500 or 750 ml) of fluid every 20 minutes, and adolescents may consume 960 to 1440 ml of fluid every hour.

Children and teens need reminders to drink fluids, as they get distracted. Young athletes do best when they have a plan for drinking around exercise and are checking for signs of dehydration.

This are general recommendations; however, they should be adjusted to the individuals.

## SPECIAL CONSIDERATION



Telling young athletes to drink is not enough.



Learn young athletes Drinking Strategies (planned Drinking Versus Drinking to Thirst)



For the safety of all youth athletes, athletic trainers should have water or other appropriate fluids readily available, and athletes should be given regular opportunities throughout practice and events to hydrate\*



There is no easier, effective or more economical way to help performance and protect health than staying hydrated during exercise.



Wearing gloves, hats, jackets, and snow pants keeps the skier warmer but causes the body to sweat - take into consideration to wear right clothes.

\*Mangieri H. (2018) Healthy hydration for young athletes.



## SKI TUNING AND EQUIPMENT CHECK

### THE MAIN CHECKPOINTS FOR SKI TUNING AND PROTECTIVE EQUIPMENT:

- ✓ Ski edge sharpening
- ✓ Ski binding check
- ✓ Crash Helmets
- ✓ Ski Gloves
- ✓ Ski Poles

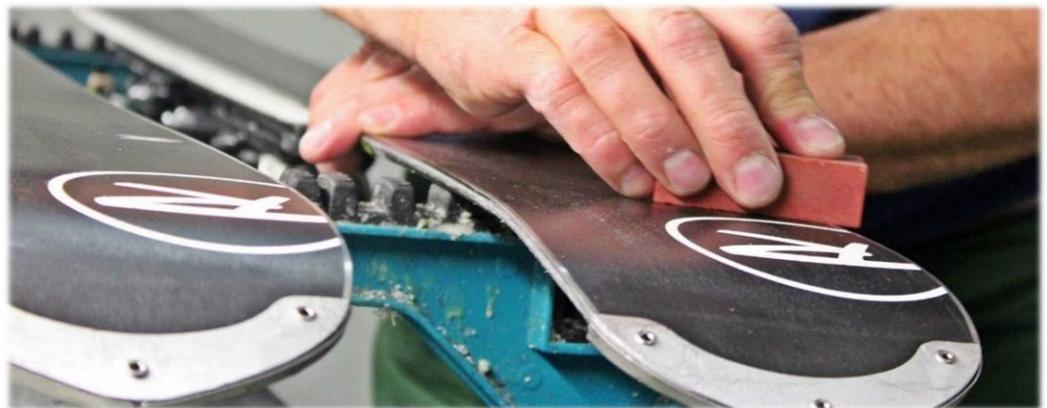
To prevent the protective equipment related hazards and injuries, coaches must be sure in accuracy of the ski edges, ski bindings, helmets, gloves, poles and other athlete related equipment. For the precautionary measures, coaches usually check the equipment in the evening before the ski session and right before the ski session in the morning.

### SKI EDGE SHARPENING

Coaches usually watch the snow report the day before a ski session and prepare the skis for the upcoming training depending on the snow conditions.

#### Soft snow conditions

If the snow forecast predicts high snowfall or warm melted snow conditions for next day's session, coaches must prepare the ski edges accordingly, and by all means not have edges too sharp as the athletes' skis might "hook the edge" in the snow and cause various minor, but also some major injuries. If the edges are already set to go sharp on the snow, coaches should have the rubber stone with them to dull the edges on all athletes' skis 10 cm in the tip and 10 cm in the tail. This method is also used by the World Cup servicemen to adjust the skis for the best performance depending on the snow conditions.



### Hard and icy snow conditions

If the snow forecast shows very light to no snowfall with previously continuously low temperatures, we can assume the training venue will be hard and icy for the ski session. Thus, coaches must sharpen the ski edges well and put the extra needle, if necessary. In addition, coaches can also use the diamond or ceramic stone to make the edges extra sharp and repeat every couple of rounds skied. This will prevent athletes from slipping on the ice and decrease the possibility of injuries.



### SKI BINDING CHECK

Before every ski training session, coaches or servicemen should check the athletes' ski bindings or be sure they have been checked previously. Regardless, the athletes' ski bindings should be checked often to prevent springs and screws from loosening. To have the maximum binding safety in place, both rear and front springs must be adjusted proper to athletes' weight and pushing force. Similarly, the length has to be set according to the boot shell length for binding force level to work properly and release in danger.



### CRASH HELMET

According to the FIS equipment specifications of 2013, every alpine ski racer entering any race event other than slalom has to wear the protective crash helmet with full plastic or carbon fiber shell. The helmet needs to be made by the FIS standards, with the authorized sticker that states "Conform to FIS Specifications RH 2013". On the other hand, the slalom helmet has no specific regulations – can have the "floppy ears".



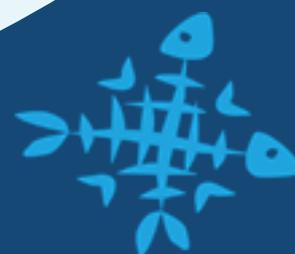
### SKI GLOVES

Ski gloves have a major role in keeping athletes' upper extremities warm, which is very important for their comfort and performance. Also, the alpine ski racing gloves have protective pads and sliders to prevent injuries such as bruised or broken fingers when mistakenly hitting the gate or hard packed snow. The particular gloves on the right have an advanced safety system, LEKI trigger S system, to attach on the LEKI ski pole and release in danger.



### SKI POLES

Ski poles can play a major role in preventing the injury when skier falls and starts sliding and rolling down the slope. The particular LEKI ski poles to the right have an advanced safety system accompanied with the LEKI ski gloves. The system works on a click-in technology, where the glove attaches directly to the pole. In danger, the spring within the pole releases the glove upon the impact and saves athlete from a potential injury while falling.



## VENUE SAFETY

### THE INTERNATIONAL SKI COMPETITION RULES (ICR) BY FIS:

#### Course setting rules

- ✓ Gates must be set to delineate the desired racing line
- ✓ Before difficult jumps and difficult passages, the speed should be controlled by appropriate course setting where possible
- ✓ At places where the outside gate must be removed, in exceptional cases decided by Jury, the turning gate serves as a gate



#### Key principles and guidelines

- ✓ Focus on safety
- ✓ Set within the rules
- ✓ Set with rhythm and flow
- ✓ Set to athletes' abilities



### THE MAIN GUIDELINES FOR VENUE SAFETY:

- ✓ Venue inspection (ski course)
- ✓ Safety netting
- ✓ Course setting
- ✓ Course slipping
- ✓ Coach position and communication

### VENUE INSPECTION

On the morning of a ski training session, coaches usually take the first round up a ski lift and inspect a venue before athletes are cleared to warm-up and start the training. During the venue inspection, coaches are looking for the distance between the actual training course and the boundaries of the ski hill in order not to set the ski gates too close to potentially dangerous spots such as trees, ski lift pillars, snow guns, etc. Also, coaches inspect venue for snow conditions to plan ahead the course setting.

### SAFETY NETTING

Before the course setting, coaches usually inspect the safety netting that prevents athletes from skidding off the training course into trees, snow guns, ski lift pillars, etc. Safety B-Nets are the most common protection shields widely used on ski training venues. The nets have to be set properly next to every potentially dangerous spot. For example, if a snow gun sits in the middle of the training venue, coach has to put the safety B-net around the snow gun to prevent his athletes hitting it and injuring themselves. Below is a picture of a skier hitting a standard B-Net.



### COURSE SETTING

The training course needs to be set properly to the FIS rules and standards stated previously, meaning in giant slalom, the distance between two gates – left and right turn – needs to be set anywhere between 18m and 22m. It is important to mind the gate offset – depending on the snow conditions – while setting the course, to control the athletes' skiing speed.



### COURSE SLIPPING

After coaches have set the course, together with athletes they circle around and slip the fresh snow off the race line if there is any. This routine is very important and needs to be done properly and as many times as necessary to get the soft snow out of the way. Athletes can form a curving serpentine and slowly slip the snow down the slope.



### COACH POSITION AND ON-COURSE COMMUNICATION

After the course inspection and slipping, coaches usually gather the athletes on top of the training venue, set a two-way radio and slip down to the middle of the course for observation of the training. When athletes are ready to start training in the course, coach needs to look out for the course to be clear and communicate "course clear" through a two-way radio to the start so an athlete can kick off from the start gate. The position of the coach is usually on the spot where he can see the most of the venue and have everything under control. The coach-athlete radio communication routine:

- ✓ Athlete says his name
- ✓ Coach: Racer ready?
- ✓ Athlete: Ready!
- ✓ Coach: Course is clear
- ✓ Athlete starts



### COACHES' GENERAL COMMUNICATION

The individual communication about psychological and physical condition of young athletes is very important for their health, safety and performance. Coach should be aware of the sociological situation among his athletes; thus, it is important to conduct a periodical and individual communication with his athletes and their parents. Some good practices include following communication:

- ✓ Coach-Parent only necessary communication about athletes' health
- ✓ Coach-Coach communication about daily-weekly situation
- ✓ Coach-Doctor communication about athletes' health
- ✓ Coach-Board communication about potential safety threats and liabilities
- ✓ Coach-other authorities that secure safety of young athletes



## AUTHORS

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### **Žarko Despot**

Alpine Ski Instructor, amateur, HZUTS and IVSI licensed, with 25 years practical experience of ski teaching at Ski Klub Rijeka, more than 45 years active in Ski Klub Rijeka leadership (FIS Race director, ski course designer, ski-schools lead, former President of the ski club, member of couple local and Croatian sports association boards).





## Partner organizations

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