

APPENDIX 1

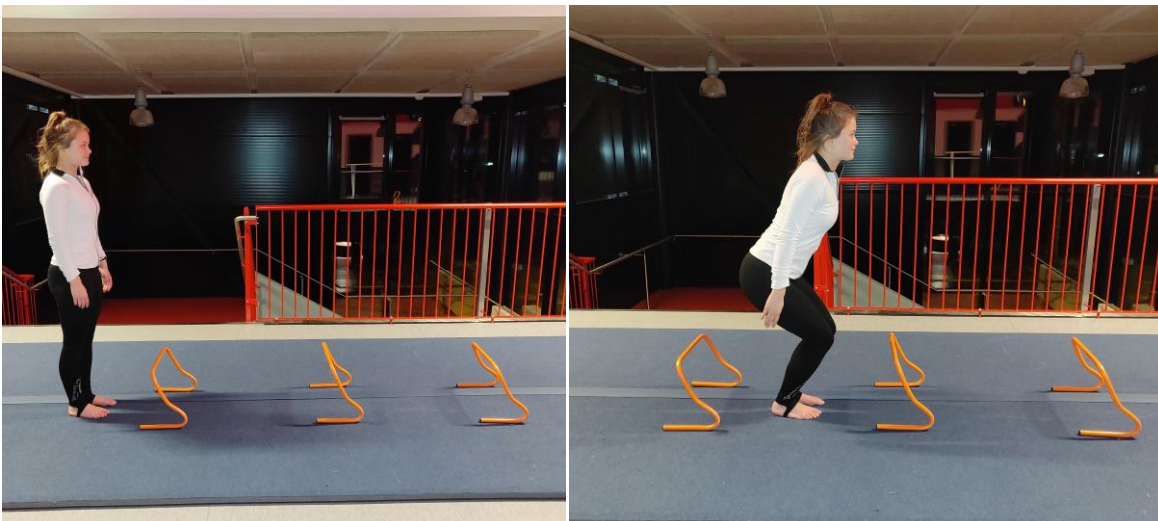
OFF-ICE TRAINING PROGRAM FOR PRIMARY PREVENTION

Plyometric exercises

These exercise aims to improve athletes' explosive power in the lower extremities, speed, coordination and agility. Plyometric exercising improves movement velocity and pure strength. It also enhances bone strength.

Exercise 1: Hurdle jumps

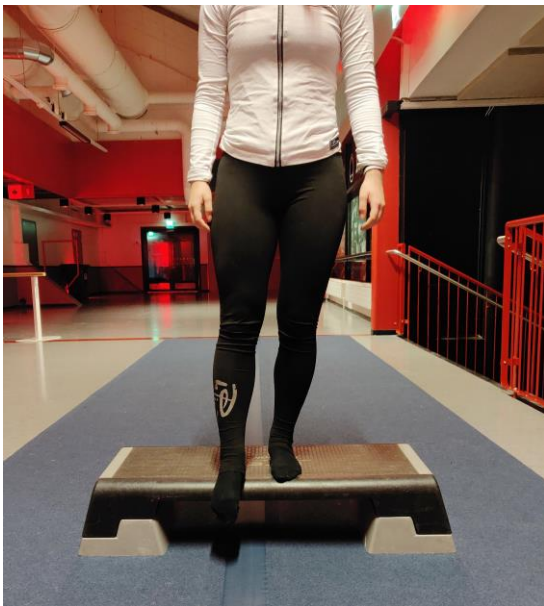
Starting position is standing tall shoulder-width apart knees slightly bent, hurdles few feet apart. Athlete begins by jumping horizontally over the hurdles swinging both arms as jumping and rebounding after every hurdle until finished. The impact of landing should be absorbed by bending from the knees. Repeat 6-10 times 1-3 sets. Rest between sets 2-3 minutes. Attention should be paid for the knee alignment, engaging the core muscles and keeping lower back straight.



Picture 1. Side view from hurdle jumps

Exercise 2: Drop jump

Starting position is standing tall shoulder with one leg. Athlete drops off from the platform following rapid explosive vertical jump with the arm swing, landing softly on two legs. Attention should be paid for keeping lower back straight and proper knee alignment during the drop off and landing of the vertical jump. Repeat 6-10 times 1-3 sets. Rest 2-3 minutes between sets.



Picture 2. Anterior view from drop jump

Exercise 3: Single leg vertical jump

Starting position is standing tall with one leg. Athlete begins by squatting down and explosively jumping upwards landing softly to the same leg. Attention should be paid to the knee alignment and eccentric muscle control when landing as well as keeping the lower back straight. Repeat 6-10 times 1-3 sets. Rest 2-3 minutes between sets.



Picture 3. Anterior view from single leg vertical jump

Strength exercises

The aim for these exercises is to develop muscular strength and control in the pelvic girdle area and lower extremities to improve knee stability and correct alignment. Decent muscular strength and explosive power especially in lower extremities and pelvic area is required for figure skaters to be able to carry out demanding elements safely.

Exercise 1: Glute bridge

Starting position is supine lying knees bent with shoulder width apart, feet flat on the ground. Athlete begins by slightly tilting her pelvis upwards and activating her glutes by squeezing them together. Next step athlete starts to lift her hips and trunk straight up from the ground, knees staying apart. Return smoothly back to the starting position. Attention should be paid for the over extension of the hip. Repeat 10-15 times and 1-3 sets. Rest 2-3 minutes between sets.



Picture 3. Side view from glute bridge

Exercise 2: Four-point kneeling with arm and leg extension

Starting position is four-point kneeling. Athletes knees are underneath the hips and hands underneath the shoulders, keeping spine and pelvis in a neutral position. Athlete begins by slowly extending opposite arm and leg. Attention should be paid for the pelvic tilt and the neutral position of spine and correct movement pattern. Repeat 10-15 times 1-3 sets. Rest between sets 2-3 minutes.



Picture 4. Four-point kneeling exercise

Exercise 3: Hip abduction in side lying

Starting position is side lying back against the wall. Lower leg should be bent, and upper leg extended. Athlete begins by slowly moving the upper leg away laterally from the midline. Attention should be paid for the core engagement and hip external rotation. Repeat 10-15 times 1-3 sets. Rest 2-3 minutes between sets.



Picture 5. anterior view from hip abduction

Exercise 4: Forward lunge

Starting position is standing tall, legs shoulder width apart and hands on the hips. Athlete begins by stepping forward and squatting down with one leg. Knee stays behind the toes correctly aligned, spine in neutral position. Pushing off from toes to come back to starting position. Repeat 10-15 times 1-3 sets. Rest 2-3 minutes between sets.



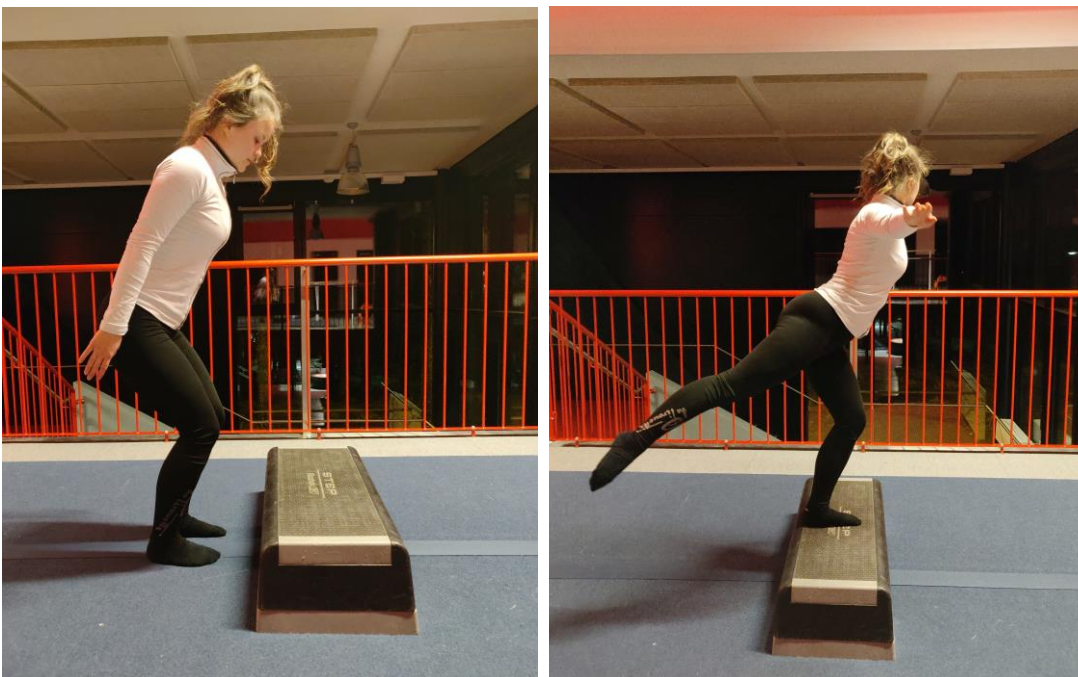
Picture 6. Side view from forward lunge

Balance exercises

These exercises aim to improve dynamic balance control, proprioception, muscle strength and postural control. Skater's ability to control the center of mass play an important role for maintaining balance.

Exercise 1: Landing position

Starting position is standing tall shoulder width apart. Athletes begins by slightly bending from the knees and jumping to step board to one leg to the jump landing position. Hold the position for 3-5 seconds. Attention should be paid for proper knee alignment and good posture.



Picture 7. Side view from landing position exercise

Exercise 2: One leg stance on unstable surface

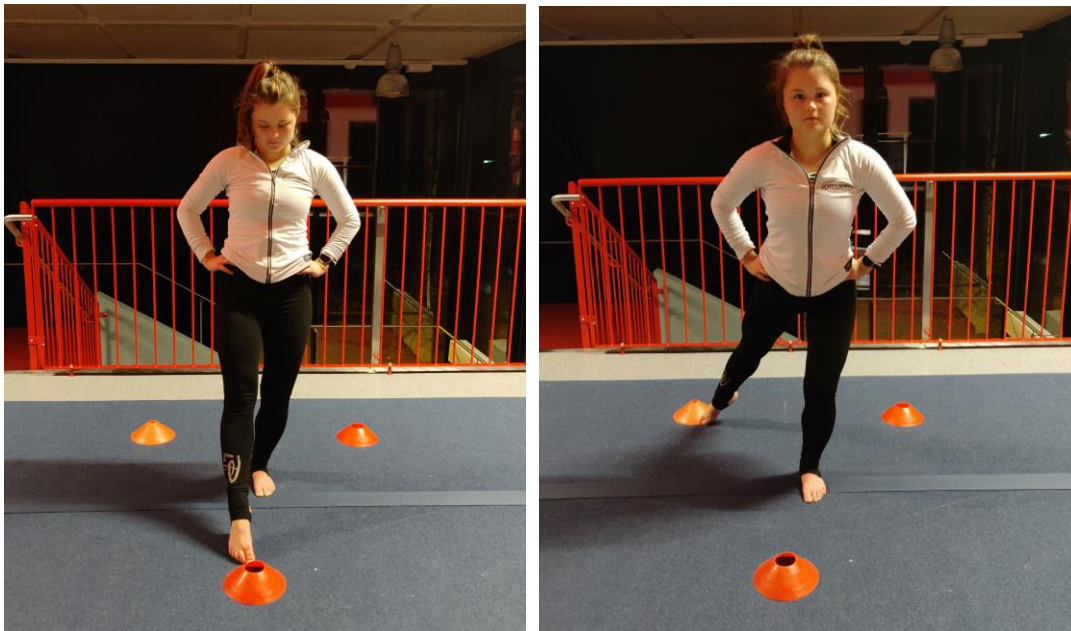
Starting position is standing tall legs shoulder width apart on top of unstable surface like bosu ball or balance board. Athlete begins slowly lifting other leg trying to maintain straight posture, hands to the sides. Hold the position 10-15 seconds. Attention should be paid for core control, tilted hip and good posture. Repeat 2-3 times each leg.



Picture 8. Anterior view from the one leg stance

Exercise 3: Y-Balance

Starting position is standing tall in the middle of cones. One leg is extended in the front and hands are fixed to the hips. Athlete begins to reach towards the cone by squatting down and pushing the cone as far as one can while controlling the movement. After returning to the starting point athlete continues to reach to the next cone. Attention should be paid for the correct alignments in the ankle-knee-hip complex and proper movement control. Repeat both sides 2-4 times.



Picture 9. Anterior view from Y-Balance exercise

Flexibility exercises

Static stretching exercises chosen to this program aim to improve flexibility specific to the sport in lower extremities, especially in the hips. Dynamic exercises aim to improve muscle coordination and enhance neural activity. Good flexibility is necessary for skaters to be able perform elements economically and with proper technique.

Dynamic exercise 1: Inch worm

Starting from push-up position, keeping spine in neutral position and legs extended. Athlete begins by slowly walking one's legs toward hands keeping the knees straight and spine extended. When feeling stretch in the back of the legs, hold the position for 1-2 seconds. Continue the movement by walking with hands back to the starting position. Repeat 6-10 times.



Picture 10. Side view for the inch worm, from the starting position and stretch

Dynamic exercise 2: Spider

Starting from push-up position. Athlete begins by bringing one leg forward next to one's hands simultaneously extending hips towards the ground. Knees and spine should remain straight. Hold the position 1-2 seconds and repeat on the other side. Repeat 6-10 times.



Picture 11. Side view from spider stretch

Dynamic exercise 3: Straight leg march

Start position is standing tall with one leg extended in front of the other and arms are lifted straight to the front. Athlete begins by walking forward kicking one leg up toward hands keeping the knee extended and keeping spine in neutral position. Repeat on 6-10 times.



Picture 12. Side view from straight leg marching

Dynamic exercise 4: Deep squat

Starting position is standing tall legs shoulder width apart. Stick is extended overhead. Athlete begins slowly squatting down maintaining the spine in neutral position, trunk extended and flexing from the hips keeping knees correctly aligned over toes. Repeat 6-10 times.



Picture 13. Anterior view and side view from deep squat

Static exercise 1: Hamstring stretch

Starting position is four-point kneeling. Athlete extends other leg in front of the body, hips flexed facing forward. Spine should be maintained straight, arms supporting on either side of the body. Hold the position 20-30 seconds both sides.



Picture 14. Side view for the hamstring stretch.

Static exercise 3: Quadriceps stretch

Starting position is side lying on the mat. Athlete begins by taking a grip from upper leg, extending the hip and keeping spine in neutral position and flexing from the knee. Lower leg should be flexed from the hips and knee for increased surface for support. Hold the position for 20-30 seconds on both sides.



Picture 15. Anterior view for the quadriceps stretch

Static exercise 4: Gluteal stretch

Starting position is supine lying on the mat. Athlete takes a grip from the ankle and pulling it towards oneself by flexing from the hip and bending the knee. Hip is externally rotated. Other leg should stay straight and grounded. Hold the position 20-30 seconds.



Picture 16. Side view for the gluteal stretch.

Static exercise 5: Split stretch

Starting position is extending the other leg to the front, anteriorly flexing the front side hip. Other leg is extended behind, posterior side of the hip extended. Arms are positioned to the mat on either side of the body for support. Knees and trunk should be extended keeping the center of gravity in the midline. Hold the position for 20-30 seconds on both sides.



Picture 17. Side view from the split stretch

WHAT NEEDS TO BE TAKEN INTO CONSIDERATION IN PRIMARY PREVENTION WHEN COACHING CHILDREN?

Primary prevention should begin at early age for best result. As a coach, it is essential that you have basic knowledge concerning risk factors that induces children to overuse injuries. Arising from the athlete's qualities, environment and from the sport itself, it is your responsibility to identify risks and intervene. Many overuse injuries are the consequence of doing too much repetitive and one-sided exercises too frequently. Also, rapid changes in exercising, training conditions e.g. hard floor or bad equipment (footwear) increases the risk. Many injuries could have been prevented if attention had been paid to the risk factors and cause of injuries when practicing and competing.

Proper planning and execution of training are at key position in injury prevention. Age, base of fitness components and skills, as well as structural and functional anatomy should be considered when planning exercising. Diverse exercising is considered of being the corner stone for overall development of young athletes' physical components and motor skills. Intensity, volume, load and timing of exercising should be planned in a way, that the athlete has enough time for recovery between exercise sessions.

Warm-up, cool down and flexibility training should be included to young athletes' routines. Load and volume of training should be gradually raised incorporating learning of new exercises and elements. More focus demanding tasks should be executed in the beginning of the session since the athletes are most receptive for then.

Learning right performance techniques is important starting from basic movements. Controlling basic movement skills such as running, squatting or jumping is fundamental for learning skills that are specific for figure skaters. Good movement control and rightful techniques prevent skaters from musculoskeletal impairments. Furthermore, it enables efficient, safe, and effortless movement.

Training conditions should always be taken into consideration. Hard floor exposes knee joint for heavier loading especially when landing jumps. The use of mirrors is also recommended for observing correct technique and alignments from all sides; front, back and side.

Effective exercise programs based on research includes functional, diverse and alternating running, agility, balance, plyometric and strength training exercises, multi exposure exercises, basic and sport-

specific movement control exercises. Functional flexibility exercises have also been found beneficial. Good flexibility is necessary for skaters to be able perform elements economically and with proper technique.

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I acknowledge that ownership of such material is retained by the author.

Parent/Guardian Name:

Signature: _____

Date: _____