

# SKATE AUSTRALIA ARTISTIC COACHING ACCREDITATION

## Fitness Manual

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## SECTION 1: INTRODUCTION

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To be a good skater it requires the “balance of a tightrope walker, the endurance of a marathon runner, the aggressiveness of a football player, the agility of a wrestler, the nerves of a golfer, the flexibility of a gymnast and the grace of a ballet dancer” (Provost-Craig & Pitsos, 1997). This quote by Johnny Heater made at the US figure skating championships sums up the underlying components which make up artistic skating. Although research specific to the sport is still in early days, there is an increasing wealth of research and evidence outlining the specific areas of fitness which impact upon artistic roller skating. These include flexibility, agility, muscular strength, muscular endurance, muscular power, endurance (aerobic and anaerobic).



**Figure 1:** Fitness requirements of skating (Provost-Craig & Pitsos, 1997).

Alternated between accumulation (low intensity/high volume) and intensification (high intensity/low volume). The shorter rest intervals associated with the accumulation phase will help skaters develop muscular endurance, and the higher growth hormone production will help these athletes maintain low body fat levels. During the accumulation phase I’ve often found it’s best to focus on addressing structural balance issues that result from such a high volume of sport-specific training, as these exercises are generally less technical in nature. Also, during this phase I will look at the muscles that are frequently injured in an athlete’s sport (and with skaters it’s often the knees and lower back) and to, using the popular term used now by strength coaches, “pre-hab” exercises so that if an athlete does injure that area, they will be able to rehab those areas much faster.

The heavier weights and longer rest intervals associated with the intensification phase are the ideal format for more sport-specific, functional exercises. Because skaters jump from and land on one leg, split squats and step-ups would be good for these athletes. If an athlete has the training experience and a good coach, they could also include Olympic lifting types of exercises in this phase such as power snatches and power cleans. Plyometrics could be used in this phase, but when you consider that skaters already perform such a high volume of jumps in their training and that they skate year-round, such exercises could easily lead to overuse injuries.

## SECTION 2: ENDURANCE TRAINING

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Aerobic training improves a skaters ability to use oxygen to sustain activity for the time necessary to complete a program by boosting aerobic (lungs and heart) capacity (San Diego Figure Skating Communications, 2012). It is essential to match the energy requirements of the program with specific training patterns of intensity, frequency, and recovery time with *event-specific* competition goals (San Diego Figure Skating Communications, 2012). Aerobic training largely occurs in slow-twitch fibers and muscles support systems (e.g., respiratory, endocrine) that increase cardio fitness and muscular endurance including:

- Increases in the number of mitochondria (small structures known as the *powerhouses*) inside muscle cells that produce energy from oxygen
- An increase in the ability of muscle to use fat as a source of fuel
- An increase in lung capacity
- An increase in the volume of blood pumped with each beat
- Changes in levels of hormones (epinephrine) that break down and move fat through the body for use as a fuel,
- An increase in lean body weight

(San Diego Figure Skating Communications, 2012).

Intensity (how hard), duration (how long), and frequency (how often) are key ways to improve cardio activity. Fitness improves when intensity is between 70-80% of maximum heart rate, but this may not be adequate for the endurance/stamina of senior level skaters in elite international events (San Diego Figure Skating Communications, 2012).

For energy-system training, aerobic exercise is often recommended for skaters, but there are articles which argue the efficacy of this (Poliquin, 2012). In this argument, it purports that the short-term energy system is predominately used in figure skating, and performing treadmill workouts that focus on working at 60-80 percent of max heart rate for 30-45 minutes will not prepare an athlete whose sport will spike their heart rate to 100 percent in a matter of seconds (Poliquin, 2012). It is also raised that there can be long-term problems associated with focusing on aerobic exercise with young athletes, such as overtaxing the adrenal glands and reducing the ability of the body to use the Type IIb muscle fibers (Poliquin, 2012).

Aerobic endurance can be sub-divided as follows:

1. Short aerobic - 2 minutes to 8 minutes (lactic/aerobic)
2. Medium aerobic - 8 minutes to 30 minutes (mainly aerobic)
3. Long aerobic - 30 minutes + (aerobic)

Aerobic endurance is developed through continuous and interval skating:

1. Continuous duration skates to improve maximum oxygen uptake (VO<sub>2</sub>max)
2. Interval training to improve the heart as a muscular pump.

## ***2.1 AEROBIC THRESHOLD***

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The aerobic threshold, point at which anaerobic energy pathways start to operate, is considered to be around 75% of maximum heart rate. This is approximately 20 beats lower than the anaerobic threshold.

Elite athletes should utilize a High-intensity Interval Training (HIT) concept in their on and off-skate regimens. Studies have shown that HIT is a time-efficient strategy to stimulate a number of muscle adaptations that are comparable to traditional endurance training. Figure skaters need to explore including specific activities that are used in interval training workouts for other sports. Every fitness program must match the energy demands in terms of duration, energy intensity, and the recovery time that is needed. For example, MITF patterns allow for a short recovery period between elements and require a somewhat different training regimens than continuous activity of a free skating, pair, free dance, or precision program.

- Develop a plan that varies training exercises in intensity, duration, and recovery as part of long and short term cycles for consistent improvements to occur of a realistic over time schedule.
- Incorporate specific skating related exercises in a High Intensity Training (HIT) program.
- The training plan must establish a baseline of the heart's resting level and monitor the changes, in the resting rate, that occurs on a weekly schedule. The fewer beats per minute indicates a higher stroke volume which is a positive training effect.
- Incorporate a nutritional plan into the training plan. The skater must daily monitor their calories intake to ensure that energy consumption is consistent with energy expenditure to maintain the desired lean body mass.
- Retain a relative low percentage of body weight/fat percentage, without excessively reducing calories. Any weight loss program should be under a doctor's supervision.
- Intense exercise activity stimulates [anaerobic](#) muscle metabolism.
- A well designed [peak performance training program](#) should develop the proper balance of both types of metabolism to match the specific demand of the different figure skating disciplines.

<http://iceskatingresources.org/AerobicTraining.html>

## ***2.2 ANAEROBIC ENDURANCE***

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Anaerobic means 'without oxygen'. During anaerobic work, involving maximum effort, the body is working so hard that the demands for oxygen and fuel exceed the rate of supply. The muscles have to rely on stored reserves of fuel. In this case, waste products accumulate, the chief one being lactic acid. The muscles, being starved of oxygen, take the body into a state known as 'oxygen debt'. The body's stored fuel soon runs out and activity ceases - painfully. This point is often measured as the lactic threshold or anaerobic threshold or onset of blood lactate accumulation (OBLA).

Anaerobic endurance can be sub-divided as follows:

1. Short anaerobic - less than 25 seconds (mainly lactic)
2. Medium anaerobic - 25 seconds to 60 seconds (mainly lactic)
3. Long anaerobic - 60 seconds to 120 seconds (lactic + aerobic)

Anaerobic endurance can be developed by using repetition methods of relatively high intensity work with limited recovery.

## ***2.3 ANAEROBIC THRESHOLD***

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The anaerobic threshold, the point at which lactic acid starts to accumulate in the muscles, is considered to be somewhere between 85% and 90% of your maximum heart rate. This is approximately 20 beats higher than the aerobic threshold. Your anaerobic threshold can be determined with anaerobic threshold testing.

## ***2.4 SPEED ENDURANCE***

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Speed endurance is used to develop the co-ordination of muscle contraction. Repetition methods are used with a high number of sets, low number of repetitions per set and an intensity greater than 85% with distances covered from 60% to 120% of racing distance.

## **2.5 STRENGTH ENDURANCE**

Strength endurance is used to develop the athlete's capacity to maintain the quality of their muscles' contractile force. All athletes need to develop a basic level of strength endurance. Examples of activities to develop strength endurance besides skating are - circuit training, weight training, hill running, harness running, Fartlek etc

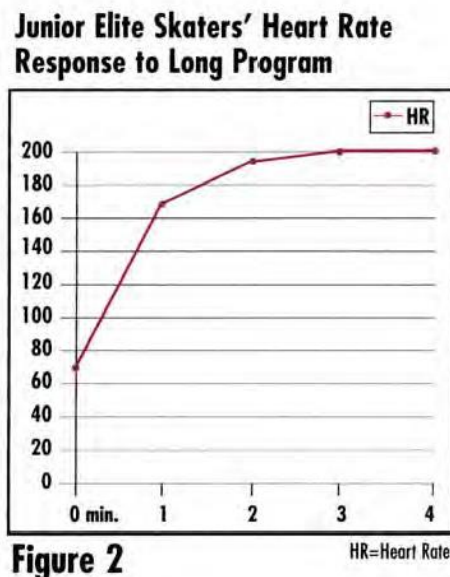
<http://www.blackdiamondsports.com/articles.asp?id=110>

The long and short programs both require cardiovascular endurance and anaerobic capacity which can be attained through a combination of continuous cardiovascular training and high-intensity interval training. Flexibility, although not depicted in figure 1 is also a requirement of skating and is acquired through a daily stretching program. The remainder of this article will concentrate on the cardiovascular aspects of training.

To get the best results from an off-skate or on-skate training program, the training must be as similar to the competitive event as possible (specificity of training) and the conditioning program must place an increased stress on the system being trained (overload principle).

It is clear that within the first two minutes skaters are at their maximal heart rate and they maintain the maximal heart rate for the last two minutes. Competitive events that are four minutes in duration (long program) utilise both the aerobic and anaerobic energy systems. For approximately the first two minutes of the program the energy used to skate comes from energy stored in the muscle. This is called the anaerobic energy system.

During the last two minutes, the energy used in skating comes from the oxygen in the air. This is called the aerobic energy system. Therefore it is important that skaters train aerobically to increase their endurance and anaerobically to decrease the rate at which lactic acid accumulates in the bloodstream and causes the skater to become fatigued.





Past research has shown that while highly trained junior level skaters have a good peak VO<sub>2</sub>, the best measure of cardiovascular endurance, it is much lower than world-class skaters. With the proper cardiovascular conditioning program, skaters could increase their cardiovascular endurance (aerobic energy system) by as much as 20 – 30 percent. In addition, these same skaters could delay the point at which lactic acid builds up in the bloodstream (anaerobic energy system) by approximately 20 percent.

These factors would have a significant impact on the ability of the skater to land jumps and perform lifts late in the program. Heart rate monitoring of a typical on-skate patch session and an off-skate session where jumps were practiced showed that the average heart response is not high enough or sustained for long enough to produce a cardiovascular training response. However on-skate power stroking is of sufficient intensity and duration to produce a cardiovascular training response.

Aerobic training in the late off-season would consist of exercising continuously on a slideboard, bicycle, skipping rope, treadmill or other aerobic training equipment for approximately 30 minutes, three times per week at 75-85 percent of their predicted maximal heart rate.

Anaerobic training in the pre-season consists of high intensity interval training at a heart rate that is equal to 85-95 percent. It is recommended that a sport-specific training device like the slide board be used for anaerobic training, but other cardiovascular conditioning equipment like the bicycle, skipping rope or treadmill may also be used for anaerobic training.

[http://www.usfsa.org/Content/parentsarticles/Sports%20Medicine April%201997.pdf](http://www.usfsa.org/Content/parentsarticles/Sports%20Medicine%20April%201997.pdf)

Once aerobic endurance is developed the athlete is now ready to start working on their anaerobic endurance and more importantly their sport specific conditioning.

Anaerobic endurance is when oxygen is not present, generally in the first two minutes of exercise where the body depends on energy already stored in the body. This is the time when lactic acid begins to accumulate in the muscles and blood; which is the heavy feeling in one's legs that an athlete may feel by the end of their skating program. By doing anaerobic training and GPP training, the body is now able to do more work over a period of time before lactic acid accumulation begins and a tolerance to the lactic acid will start to develop in the muscles from this type of training.

To get the best results, both on and off skates, it is important for the conditioning to mimic the sport as much as possible. When training off skates, an athlete can utilize any piece of cardiovascular equipment (bike, stepper, slide board), intervals, GPP work (sled dragging) and complexes. Complexes are when particular strength training exercises are combined into one set. For example, you may do a set of 6 front squats, 6 push presses, 6 bent-over-rows, 6 Romanian deadlifts.

The purpose of GPP work and complexes is to increase the athlete's total work volume, which means how much they can handle at any given moment. By increasing total work volume the athlete will become better prepared to handle the rigors of a skating program especially as the length of the program reaches three minutes or greater.

When training on skates, one of the best methods for improving athletic conditioning level is to do a double run-throughs. (Programs that are done back-to-back with a short break between). However, there are other means such as; timed drills with crossovers and footwork, interval training drills, circular jumping drills and full-rink jumping drills. All of these will tax the body in a way very similar to what the athlete experiences when performing their skating program.

## ***2.6 REVIEW OF POSSIBLE AEROBIC EXERCISES:***

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### **On-Skate**

1. Daily Skating
2. Continuous skating done over a freestyle session with minimal breaks

### **Off-Skate**

1. Cardiovascular Equipment
2. Moderate intensity exercise with a frequency and duration based upon skating level and the athlete's need (duration and time will depend on level of skater)
3. GPP Work  
Sled dragging for a set distance and/or number of repetitions

## ***2.7 REVIEW OF POSSIBLE ANAEROBIC EXERCISES:***

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### **On-Skate**

1. Double Run-Throughs
2. When the program is done in succession with a short break for water.
3. Generally a skater would start with both programs being singles and as conditioning level improves the level of jumps can increase to what is actually in the program.
4. Interval Training
5. Combination of high and low intensity exercises done on the rink for a set length of time (jumps/crossovers/Moves-in-the-Field)
  1. Timed Crossover-Footwork Drills
6. Drills utilized to work on power and flow from one element to another for a set length of time.
7. Examples of:
  1. Forward Crossovers – Forward Outside Three-Turn – Back Outside Three-Turn – Mohawk – Checkout – Step Forward
  2. Backward Crossovers – Back Inside Three-Turn – Jump-Cross – Back Inside Three-Turn – Jump-Cross
  3. Circular Jumping Drills
    1. Drills where a set number of jumps are done in a pattern involving skating skills.
    2. Anywhere from 4 to 8 jumps can be done in succession based on the skating and conditioning level of the athlete.
    3. Example of:
      1. Forward Crossovers – Forward Inside Triple Three-Turn – Axel
      2. Backward Crossovers – Back Outside Three-Turn – Mohawk – Back Inside Double Three-Turn – Back Outside Double Three-Turn – Axel
  4. Full-Rink Jumping Drills
    1. 1. A set number of jumps (4 to 8 jumps) are done utilizing the entire rink surface while demonstrating good skating skills and transitions from one side of the rink to the other.
8. The intricacy of each drill can depend on the level of the athlete, generally there is either footwork before the jump or after the landing of the jump or a combination of both.

**Off-Skate**

1. Interval Training
2. Combination of high and low intensity exercises for a set length of time.
3. Complexes
4. Exercises done in succession to place stress on the body through the use of multiple strength training exercises.
5. Number of exercises can vary based on goals and periodization.
6. Number of sets and repetitions will depend on the number of exercises being utilized along with the amount of weight.

## SECTION 3 DESIGNING AN APPROPRIATE CONDITIONING PROGRAM:

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When designing a conditioning program to compliment one's skating, it is imperative to first look at the age and skill level of the athlete. Every athlete will have different needs, which is why no set program is listed in this article, just ideas. Some athletes may have the necessary power required in a program, but may not have the level of conditioning needed to maintain this power throughout the program. Others may have the opposite situation of being able to make it through a program relatively easily, however, lack the power. At the same time you may have an athlete who has difficult with conditioning and maintaining power in the program.

Another factor to consider is the time of the skating season, since you do not want to be over-training an athlete with too much work or incorrect conditioning especially at the wrong time of the season. It is too easy to try to have an athlete work on all of this at one time, but that is not the best format since this will cause plateaus in one's progression. Once you have looked at all the possibilities, then you can choose exercises or drills that can be utilized both on and off skates that address the athlete's needs.

For many athletes moving up a level this season, an increase of thirty seconds to a program can place a large demand on an unprepared body. It is for this reason that conditioning both on and off skates is a necessary component of fitness for a figure skater.

[http://www.csadvantage.org/C\\_S\\_A/Articles-Conditioning\\_101.html](http://www.csadvantage.org/C_S_A/Articles-Conditioning_101.html)

### ***3.1 FLEXIBILITY TRAINING***

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#### **General Warm-Up:**

As an athlete, you should do a general warm-up of approximately five minutes (or until you are sweating). The warm-up consists of aerobic activity to increase heart rate, blood flow, muscle temperature, and breathing rate. This should be followed by total body static stretching. Warming up allows muscles to stretch more easily and joints to move more easily. Examples of aerobic activity are:

- Jogging in place or jogging stairs
- Jumping rope
- Bench stepping
- Slide board
- Jumping jacks

**Specific Warm-Up/Dynamic Flexibility:**

You should perform specific dynamic movements after the general warm-up and stretching. Some examples are:

- Ankle bounces and double-arm swings
- Double-leg lateral jumps
- Single-leg skip bounds
- Trunk/torso rotations
- Dry land rotational jumps: ¼ turns, singles, axels, doubles, triples
- Footwork drills

**Cool-Down:**

It is necessary to perform specific cool-down exercises in addition to stretching. These exercises are done after an intense practice session or competition program to enhance recovery and prepare for the following day. Cool-down exercises include:

- Light to moderate intensity aerobic exercise
- Jogging in place (light & easy)
- Easy stroking on skates (post practice)
- Bench steps (low, easy pace)
- Slide board (easy pace)
- Total body stretches, especially stretching.

Flexibility is defined as the ability of a muscle to lengthen without injury. We normally think of a muscle that is stretched only when we are actively trying to lengthen our muscles to increase our flexibility, however, when a joint in the body is moved, the muscles around that joint on one side of the body are shortened (contracted) while the muscles on the other side of the body are lengthened (stretched).

All muscles in the body cross at least one joint, and a joint must be moved (flexed, extended, rotated, etc.) in order for the muscle(s) to be stretched at that joint. Because of this, whenever a skater strokes, jumps, spins, and performs footwork the muscles in the working part of the body are contracting (tightening) and stretching or lengthening. Muscles shorten and lengthen through all movement, but this is not enough to increase flexibility for the sport of figure skating.

The purpose of training muscles to be more flexible is to:

- Increase the range of motion
- Reduce muscle tension
- Increase the level of certain skills and muscular efficiency
- Reduce the severity or prevent injuries
- Improve body alignment and muscular symmetry
- Delay the onset of muscle fatigue and prevention of muscle soreness after training
- Promote mental relaxation and help the mind to take control of the body

Athletes in all sports develop muscle imbalances due to their day-to-day training. In figure skating, a skater always goes into jumps and spins rotating the same direction, landings are always on the same leg, and there are many other elements that are always started on the same foot or go the same direction. This causes the athlete to develop muscle imbalances simply from training. Hence, sports medicine doctors have established that skaters can have problems with inflexibility in specific areas of their bodies due to their training.

Regular stretching can aid in alleviating muscle imbalances, injury prevention or reduce the severity of injuries. Areas of the body that are generally tight for figure skaters are: lower back, hamstrings, calf and Achilles tendon, hip flexors, quadriceps, and groin. In addition to stretching these specific areas, stretches for the chest, upper back and shoulder area are also appropriate. It is important that these areas be stretched frequently.

In order to realize the benefits of stretching, such as increased flexibility and injury prevention, how often one stretches is very important. **It is best to stretch after a warm-up and particularly, after each skating session. Types of Stretches:** There are several different types of stretches that you can practice, and it is important to know the types of stretches in order to choose the right type of stretch to perform.

### **Passive:**

Usually performed when an outside force (towel or partner) applies stretch to a relaxed joint. The stretch must be performed slowly in order to prevent injuries due to forceful manipulation of the body part. Communication between the partners is imperative.

### **Static**

Can be performed alone and refers to when a muscle is slowly lengthened to its “end point”, held for 15-30 seconds and repeated three to five times. Slowly “creep” further into the stretch as the tension in the muscle begins to relax. **Recommended type of stretching.** Researchers have demonstrated that permanent lengthening is achieved when static stretching is performed slowly, at lower force and for longer duration while the core body temperature is elevated.

### **Ballistic**

“bouncing” a stretch. This is more likely to initiate the stretch reflex, which is a nerve response that tells the muscle to contract if it is stretched beyond its limit. This is the point where injury could occur. You must be careful not to over stretch (go beyond the “end point”) and injure the muscle. Generally not recommended.

### **Dynamic or Functional**

The ability to use a range of joint movement for a particular movement within sport or physical activity. These movements are performed either slowly or rapidly. Dynamic or Functional stretching is considered a type of ballistic stretch and caution should be used when performing this type of stretch. A warm-up is recommended before stretching and then progress to static stretching before attempting any dynamic type of stretching.

### **PNF**

Proprioceptive neuromuscular facilitation. Techniques are: contract/relax and contract/relax against contract. You need to know which is the target muscle, move to the end point, put the target muscle on tension, then contract the target muscle during the stretch while relaxing the opposing muscle. The contraction does not have to be maximum, only 50% of the contraction. Hold the contraction for five seconds, move to the new end point, and hold the stretch for 12-15 seconds and repeat the process. PNF stretching develops strength, and it meets the goals of joint stability and mobility due to muscular contractions. **To be able to do this kind of stretching safely and effectively requires specific instruction and thorough understanding.**

<http://www.usfsa.org/content/Warm%20Up%20Stretching%20Flexibility%20Cool%20Down%20Pre%20Juv%20Inter.pdf>



## 3.2 STRETCHING EXERCISES

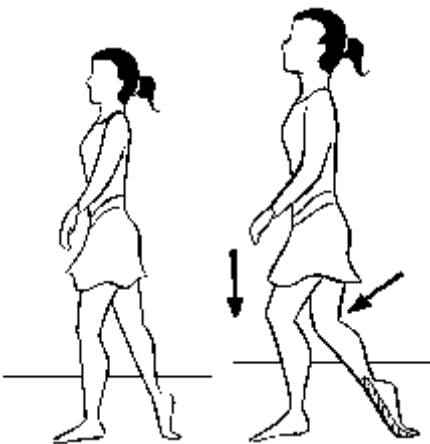
The following exercises are presented by the [Western Ontario Sport Sciences Committee](#). This is the first of what is hoped will be various resources developed by the Committee for our coaches and skaters.


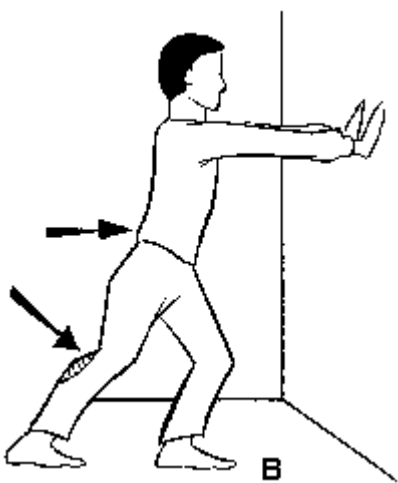
■ Before you begin be sure to read [Notes On Stretching](#)

**Stretching Exercises for:**

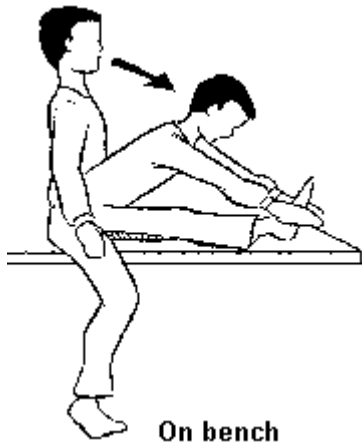
|                                    |                                 |                                   |
|------------------------------------|---------------------------------|-----------------------------------|
| <a href="#">Ankle</a>              | <a href="#">Calf Complex</a>    | <a href="#">Hamstring</a>         |
| <a href="#">Quadriceps</a>         | <a href="#">Hip Flexor</a>      | <a href="#">Adductors</a>         |
| <a href="#">Iliotibial Band</a>    | <a href="#">Piriformis</a>      | <a href="#">Gluteus</a>           |
| <a href="#">Neck</a>               | <a href="#">Upper Back</a>      | <a href="#">Low Back</a>          |
| <a href="#">Quadratus Lumborum</a> | <a href="#">Chest</a>           | <a href="#">Biceps</a>            |
| <a href="#">Triceps</a>            | <a href="#">Forearm Flexors</a> | <a href="#">Forearm Extensors</a> |

▨ - area stretch will be felt

| Stretch   | Positioning   | Reason   |
|---|---|--|
| <p><b>Ankle</b></p>  | <ul style="list-style-type: none"> <li>• Standing with one foot behind the other,</li> <li>• Point the foot/toes of your back leg over so that the tops of the toes are resting on the ground.</li> <li>• Bend both knees slightly until you feel a stretch in the front of the leg and ankle of the back leg.</li> </ul> | <ul style="list-style-type: none"> <li>• Increased ability to point the toes</li> </ul> <p><b>Example of a Skill</b></p> <ul style="list-style-type: none"> <li>• Better line of the leg in dance and in edge sequences</li> <li>• Free leg positions in landings and spirals</li> <li>• Field moves (pivots)</li> </ul> |
| <p><b>Calf</b></p> <p style="text-align: right;"><b>Complex</b></p>                                     | <p><b>A</b></p> <ul style="list-style-type: none"> <li>• Standing with one foot in front of the other,</li> <li>• Slowly bend the front leg to shift your weight forward.</li> <li>• Keep your back leg straight and press your heel to the</li> </ul>  | <ul style="list-style-type: none"> <li>• Increased power for jumping.</li> <li>• Increased knee bend</li> </ul> <p><b>Example of Skill</b></p> <ul style="list-style-type: none"> <li>• Increased knee bend and flow in</li> </ul>   |

|  |   |   |
|--|---|---|
|  <p style="text-align: center;"><b>A</b></p>  | <p>ground.</p> <ul style="list-style-type: none"> <li>• Hint: it may be helpful to do against a wall.</li> <li>• You should feel a stretch in the calf of your back leg.</li> </ul> | <p>dance and footwork</p> <ul style="list-style-type: none"> <li>• Landings of all jumps</li> <li>• Sitspin positions</li> <li>• Field moves</li> </ul> |
|  <p style="text-align: center;"><b>B</b></p> | <p><b>B</b></p> <ul style="list-style-type: none"> <li>• Using the same position as above, bend the back leg to feel the stretch in the calf.</li> </ul>                            |   |

### Hamstring



On bench



On ground

- Position yourself on the side of a bench with the leg to be stretched straight in front of you and leave the other foot resting on the floor.

- Slowly lean forward at the hips keeping your back straight until you feel a gentle stretch in the back of your leg.

- This can also be done by sitting on the ground and reaching forward in the same manner.

- Increased ability to lift your leg higher to the front

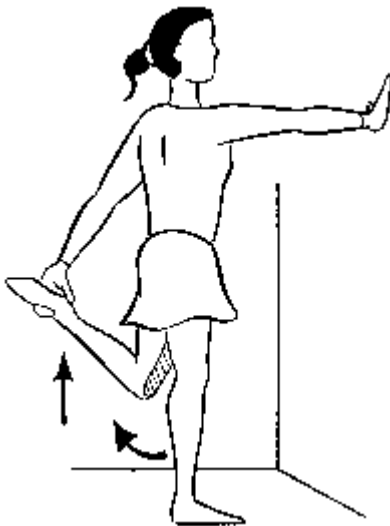
- Decreased strain on the lower back

- Increased power for jumping

#### Example of a Skill

- Sit spin
- Split Jumps
- Jump take-offs

### Quadriceps



- Standing on one leg,

- Reach behind you and hold onto the ankle of your other leg.

- Pull the ankle up and back until you feel a stretch in the front of your thigh.

- Increased power for jumping

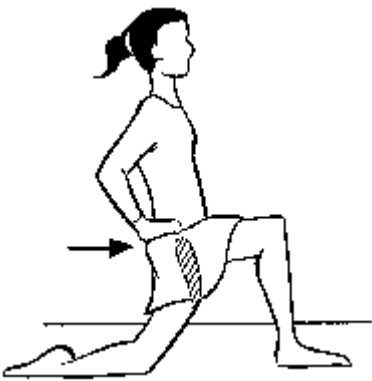
- Increased extension of the hip and flexion of the knee

#### Example of a Skill

- Better lift into jumps
- Landings of jumps

**Hip**

**Flexor**



**For the right side:**

- Kneel down on your right knee.
- Place your left leg in front of you at an angle greater than 90 degrees.
- Push your hips forward until you feel a stretch in the front of the right hip (the side which you are kneeling on).

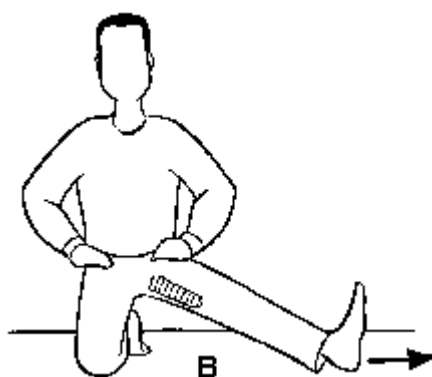
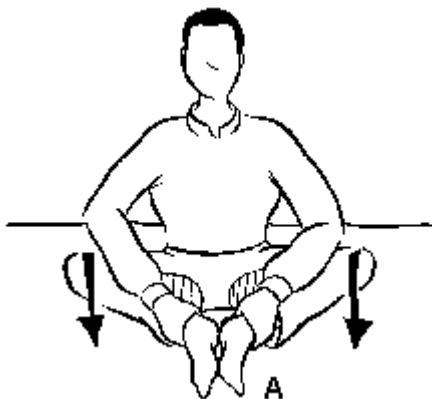
- Increased hip extension
- Decreased strain on the low back

**Example of a Skill**

- Increases the flexibility on landings and in dance positions of leg extension
- Layback spin positions (skating leg)

Camel spin positions (free leg)

**Adductors**



**A: Sitting Down**

- Place the bottoms of your feet together and allow your knees to drop out to the sides.

- Gently press on your knees towards the floor to feel a stretch on the inside of your thighs.

**B: Kneeling**

- Kneeling on one knee with the other leg straight out to the side,

- Point the toes of your straight leg up towards the ceiling.

Slide the straight leg slowly away from you until you feel the stretch on the inside of your thigh.

- Increased leg lifts to the side

- Increased power for jumping

**Example of a Skill**

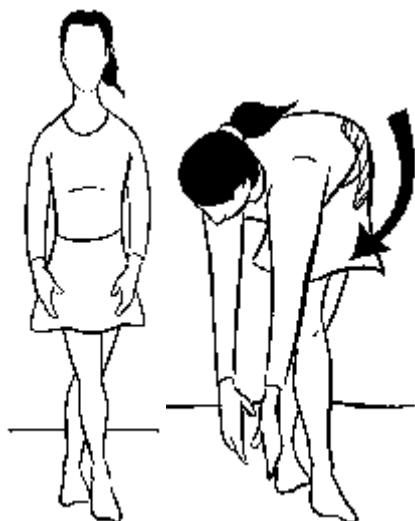
- Flying camel, death drop, butterfly

- Spiral

- Jump take-offs

**Iliotibial**

**Band**



- Cross one leg behind the other.

- Bend both knees slightly so that your knees are not locked.

- Bend over and reach towards the toes of the leg which is crossed behind.

- The stretch should be felt on the outside of the leg which is crossed behind.

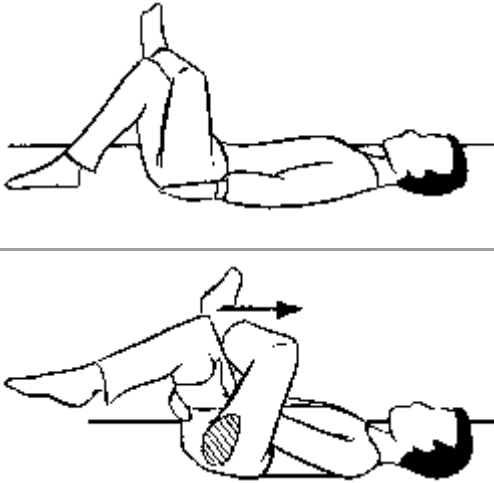

- Decreased compression of the femoral condyle and patella femoral joint

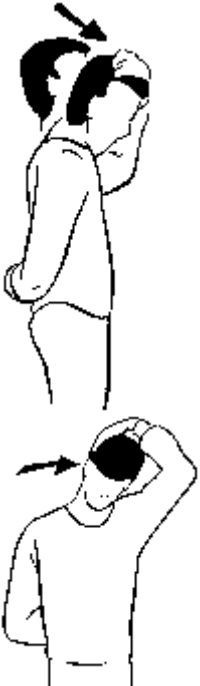

- Decreased lateral pull on the patella allowing it to have better mechanics


**Example of a Skill**

- Better line of the pelvis on cross behinds during footwork



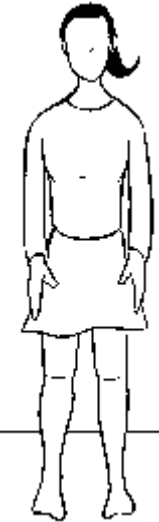

- Cross foot spins

|  |  |   |
|--|--|---|
| <p><b>Piriformis</b></p>  | <ul style="list-style-type: none"> <li>• Lying on your back with one knee bent to 90 degrees,</li> <li>• Place the ankle of the other leg on the knee of the bent leg.</li> <li>• Grasp around the thigh of the foot on the ground and gently pull your leg towards your chest.</li> <li>• A stretch should be felt in the gluteus area.</li> </ul>      | <ul style="list-style-type: none"> <li>• Increased power in jumping</li> <li>• Balances the pelvis muscularly</li> <li>• Decreased tension in gluteus area</li> </ul> <p><b>Example of a Skill</b></p> <ul style="list-style-type: none"> <li>• Increased flow on cross behinds and connecting steps</li> <li>• Jump takeoff steps and fly sit spins</li> </ul> |
| <p><b>Gluteus</b></p>    | <ul style="list-style-type: none"> <li>• Sitting with your legs out in front of you,</li> <li>• Bend one knee and cross it over the other leg.</li> <li>• Place your hands on/around the bent knee and pull it gently across your body.</li> <li>• A stretch should be felt in the gluteus area.</li> <li>• Do not twist in the lumbar spine.</li> </ul> | <ul style="list-style-type: none"> <li>• Increased stability of the pelvis</li> <li>• Decreased mechanical affects on the sacrum</li> </ul> <p><b>Example of a Skill</b></p> <ul style="list-style-type: none"> <li>• Increases the flow of edges because of the ease in crossovers (Balance)</li> <li>• Connecting steps/footwork</li> </ul>                   |

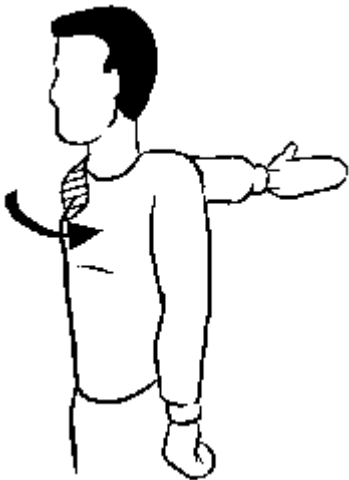
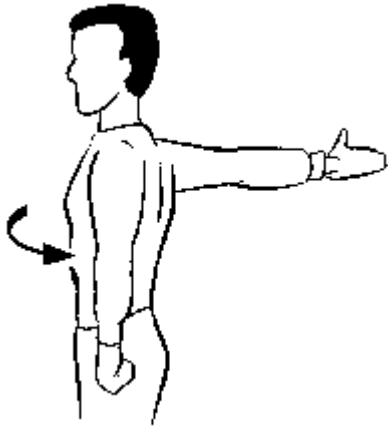
|  |   |   |
|--|---|---|
| <p><b>Neck</b></p>          | <p><b>For the right side:</b></p> <ul style="list-style-type: none"> <li>• Place your right arm behind your back at the level of your waist.</li> <li>• Place your left hand on the top of your head.</li> <li>• Gently with your left hand guide your head forward until you feel a slight stretch, then into left side bending (left ear to shoulder) and then into left rotation (rotate your head to the left).</li> <li>• You should feel a stretch on the right side of your neck.</li> </ul> | <ul style="list-style-type: none"> <li>• Decreased tension in the shoulders</li> <li>• Decreased tension in the neck</li> <li>• Increased mobility in the neck</li> </ul> <p><b>Example of a Skill</b></p> <ul style="list-style-type: none"> <li>• Ease of expression with head movement and an increase in neck mobility</li> <li>• Balance</li> <li>• Layback spins</li> </ul> |
| <p><b>Upper Back</b></p>  | <ul style="list-style-type: none"> <li>• Cross one arm in front of your chest, keep it at chest height.</li> <li>• Place your other hand on the elbow of the arm crossed in front of you and</li> </ul>   | <ul style="list-style-type: none"> <li>• Decreased tension in the shoulders and neck</li> </ul> <p><b>Example of a Skill</b></p> <ul style="list-style-type: none"> <li>• Spinning/rotation for</li> </ul>  |

|  |  |   |
|--|--|---|
|  | <p>pull your arm towards your chest.</p> <ul style="list-style-type: none"><li>• Leaning slightly forward and adding slight rotation may increase this stretch.</li><li>• A stretch should be felt through the shoulder blades and upper back.</li></ul> | <p>jumps</p> <ul style="list-style-type: none"><li>• Pair/dance positions</li></ul> |
|--|--|---|



|  |   |   |
|--|---|---|
| <p><b>Low</b></p>  <hr/>                             | <p><b>Back</b></p> <ul style="list-style-type: none"> <li>• Sit on the ground, legs out in front of you and knees slightly bent.</li> <li>• Tuck your chin towards your chest.</li> <li>• Reach forward until you feel a gentle stretch in your low back.</li> </ul>  | <ul style="list-style-type: none"> <li>• Decreased strain on the lumbar spine</li> <li>• Decreased lordosis of the low back</li> <li>• Increased flexibility in forward bending</li> <li>• Decreased strain on the hamstrings</li> </ul> <p><b>Example of a Skill</b></p> <ul style="list-style-type: none"> <li>• Sit spin</li> <li>• Dance posture</li> </ul> |
| <p><b>Quadratus</b></p>  <p><b>Lumborum</b></p>  | <p><b>For the Right side:</b></p> <ul style="list-style-type: none"> <li>• Stand with your feet shoulder width apart.</li> <li>• Let your right knee bend to allow the right hip to drop slightly.</li> <li>• Reach up over your head with your right arm and bend at the waist to the left.</li> <li>• A stretch should be felt on your right side.</li> </ul> | <ul style="list-style-type: none"> <li>• Helps to prevent pelvic muscle imbalance</li> </ul> <p><b>Example of a Skill</b></p> <ul style="list-style-type: none"> <li>• Increased flexibility in side bending for layover positions</li> <li>• Field moves</li> </ul>  |

## Chest



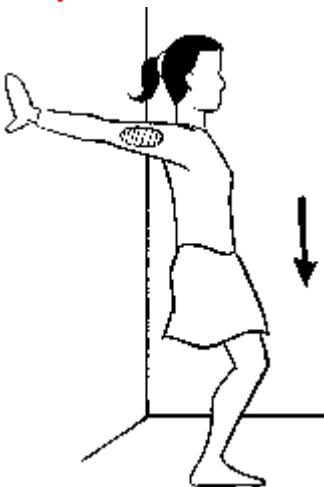
- Stand sideways about one foot from the wall.
- Place the arm closest to the wall up against it at shoulder height.
- Gently twist your whole body away from the wall to feel a stretch across your chest.

- Decreased rounding of the shoulders
- Increased power for jumps
- Increased extension of the arms

### Example of a Skill

- Improved general posture which is pleasing to look at
- Balance and stability for all skating skills

## Biceps



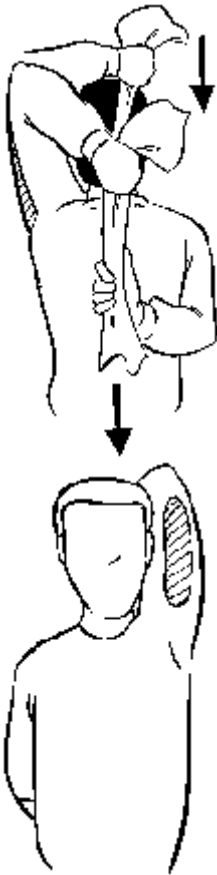
- Stand with your back to a counter or shelf (or you can just place your hand against the wall).
- Your arm should rest against or on something at shoulder height.
- Bend both knees slightly to feel a stretch in the front of the upper arm and or the shoulder.

- Increased drive up into jumps
- Increased extension of arms

### Example of a Skill

- Increased in the height of jumps
- Field moves

### Triceps



- Place one arm over your head and bend your elbow while holding a towel or a stick in your hand.
- Grab the other end of the object with your other hand by reaching behind your back.
- Gently pull down on the stick or towel with the lower arm so that you feel a stretch in the back of the arm which is over your head.

- Increased extension of your arm over head

- Decreases muscle imbalances

#### Example of a skill

- Lifts in pairs
- Arm positions over head in field moves

### Forearm Flexors




- Hold your arm out straight in front of you with your palm facing down.
- Place your other hand on the palm of the hand which is held in front of you.
- Pull the hand upwards so that the fingers point towards the ceiling.
- A stretch should be felt on the under side of the forearm.

- Prevents muscle imbalances between the flexors and the extensors

- Prevents wrist injuries when you fall onto your hands

#### Example of a skill

- Press lifts in pairs and dance holds

|   |   |   |
|---|---|---|
| <p><b>Forearm Extensors</b></p>  | <ul style="list-style-type: none"> <li>• Hold your arm out straight in front of you with your palm facing down.</li> <li>• Place your other hand over the back of your hand which is held in front of you.</li> <li>• Pull the hand downwards so the fingers point towards the ground.</li> <li>• A stretch should be felt on the top of the forearm.</li> <li>• Twisting the hand slightly away from your body may increase this stretch.</li> </ul> | <ul style="list-style-type: none"> <li>• Prevents muscle imbalances</li> <li>• Prevents wrist injuries when you fall on your hands</li> </ul> <p><b>Example of a Skill</b></p> <ul style="list-style-type: none"> <li>• Press lifts in pairs and dance holds</li> </ul> |
|---|---|---|

<http://www.skating-wos.on.ca/sportsci/stretch.htm>

Spirals, biellmans, donut spins, split jumps, spread eagles.....just to name a few elements that require extraordinary flexibility. Yet it may surprise you which basic elements require a certain muscle length to be performed correctly. Muscle flexibility controls the angle of the knee, hip, and ankle joint on a jump take-off and landing, and a small deficit in muscle length can affect the quality of a jump. Joint position and motion, controlled by the surrounding muscle length, also affects the angle of the joints in the lower extremity during basic stroking, crossovers, spins, and footwork. Each joint in your body needs a balance of flexibility on all sides to move in the proper range of motion. If there is an imbalance of muscle length, a skater may be more prone to injury

<http://figureskating.about.com/od/officetraining/a/officedownes.htm>

## SECTION 4 SPEED/AGILITY TRAINING

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### Strength training

In terms of strength, figure skating requires high levels of relative strength to attain maximum height in the jumps; in any case, you don't want to emphasize the Type IIb fibers, as they will contribute little to jumping – besides, the extra bodyweight would compromise jumping ability. Using free weights is best, because figure skating involves considerable disruptive forces that torque the knee. Leg presses and hip sled exercises are fine for the average trainee, but the strength developed is not going to carry over to the jumps. Step-ups and lunges would be better choices. However, when training young athletes, it's important to have a progressive series of weightlifting protocols – you can't, as they say, look at children and adolescents simply as little adults.

[http://www.charlespoliquin.com/ArticlesMultimedia/Articles/Article/260/The\\_Athletes\\_Training\\_Diary\\_A\\_Classic\\_Workout\\_for\\_.aspx](http://www.charlespoliquin.com/ArticlesMultimedia/Articles/Article/260/The_Athletes_Training_Diary_A_Classic_Workout_for_.aspx)

Use of resistance, i.e. free weights, own body weight, etc., to increase your ability to exert or resist force.

- Strength training for the skater should be safe, should help prevent injury and enhance skating performance.

### **4.1 STRENGTH TRAINING BENEFITS**

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#### Performance Factors:

- Increase flexibility (for spins, spirals, artistic movements, etc.)
- Increased strength (for holding positions, take-off, rotation and landing jumps).
- Increased muscular endurance (to resist fatigue).
- Increased anaerobic power for more forceful jump take-offs, jump combinations and increased stroking force and speed.
- Positive psychological and emotional benefits (the better physically prepared skater may yield a more positive self-esteem).

## Components of Skating:

- Total Body Strengthening, i.e. shoulders, upper back, torso/abdominal, lower back, hips and legs.
- Physiology of Skating: predominately training the anaerobic energy system.
- Injury Prevention: Strengthening of the shoulder, hip and lower back, knee and ankle joint areas.

Strength training will not cause bulky muscles if done properly. Strength programs for skaters are designed specifically to avoid bulky muscles. Perform warm-up with total body flexibility stretches before doing strength exercises. Do more flexibility stretching after strength training sessions.

- Type and order of exercise should be specific. Utilize a combination of free-weight, elastic tubing and resistance using your body weight. Perform lower body, multi-joint exercises first, progressing to the more isolated movements.
- Rest periods are important for recovery and for maintaining proper exercise technique. Rests are typically one to two minutes, depending upon the strength training exercise difficulty level. Rests are taken between sets of exercises and between exercises.
- Appropriate loads or the total amount of weight lifted must be appropriate for your maturity and strength level. Example – a novice level skater who is not weight training should use considerably less resistance than a trained novice-level skater. Typically you should lift the weight that allows you to perform three to four sets of 8-15 repetitions.
- Use proper technique with -controlled moderate speed movement -good body form  
-proper alignment  
-a breath when lifting
- Always use spotters, especially for the technical total-body strength training exercises.
- Rest days (24-48 hours) are between strength training sessions for full muscular recovery.
- Pre-pubescent skaters (below the ages of 15 years old) should always have a supervisor, i.e. strength coach, parent or other knowledgeable person, present throughout the strength training session.
- Increase weight lifted by no more than five percent per week as long as correct technique is consistent. Depending on the individual progression of your strength training program, increases in resistance or weight can be as high as 10% of the total weight. Only increase the weight lifted when you can easily perform three to four sets of 8-15 repetitions.
- Proper conduct/behavior is crucial for a safe strength training environment. Skaters should be encouraged to assist or encourage each other throughout the off-ice strength training session. It is imperative that all athletes realize there is no room for foolish behavior in this and all training efforts.

## SECTION 5 THE THREE DISCIPLINES OF FIGURE SKATING

| <b>DISCIPLINE</b>     | <b>EXERCISE</b>                     | <b>SPECIFIC MUSCLE GROUP(S) TRAINED</b>   | <b>AREA TRAINED</b>      |
|-----------------------|-------------------------------------|---|--------------------------|
| Singles, Pairs        | Back Squats*                        | Quadriceps, gluteals, hamstrings, erectors  | Lower body               |
| Dance                 | Lunges                              | Quadriceps, gluteals, hamstrings, erectors  | Lower body               |
| Singles, Pairs, Dance | Heel Raises**                       | Gastrocnemius, soleus   | Lower body               |
| Singles, Pairs, Dance | Bent-knee Deadlifts*                | Hamstrings, erectors, gluteals, deltoids  | Lower body<br>Upper body |
| Singles, Pairs, Dance | Bench Press*                        | Pectoralis major, triceps, deltoid  | Upper body               |
| Pairs, Dance          | Upright Rows                        | Trapezius, deltoids   | Upper body               |
| Singles               | Behind the neck press & push press* | Quadriceps, gluteals, hamstrings, gastrocnemius, erectors, deltoids, triceps, trapezius | Total body               |
| Pairs, Dance          | Front Push Press***                 | Quadriceps, gluteals, hamstrings, gastrocnemius, erectors, deltoids, triceps, trapezius | Total body               |
| Singles, Pairs, Dance | Bent Rows**                         | Latissimus dorsi, rhomboids, deltoids   | Upper body               |
| Singles, Pairs, Dance | Push-Ups***                         | Pectoralis major, triceps   | Upper body               |
| Singles, Pairs, Dance | Abdominal Crunches**                | Abdominals  | Middle body              |
| Singles, Pairs, Dance | Cycle Crunches**                    | Obliques, abdominals  | Middle body              |

<http://www.usfsa.org/content/Strength%20Training%20Nov%20Jun%20Snr.pdf>

## ***5.1 CORE STRENGTH***

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Core strength originates from the abdominal and back muscles. These muscles work together to act as a ‘control center’ for the body’s balance and stability. In the sport of figure skating, skaters need exceptionally strong core muscles to maintain balance, check rotation and maintain a tight air position for jumping, control the center of spin rotation, and control the upper body position during footwork, stroking, and crossovers.

A skater has to have a strong core to complete double jumps and beyond. Without sufficient core strength, a skater would not maintain consistency of these elements. Without muscle strength, a skater would skate very slowly, have small jumps, have shorter and slower spins, and would tire easily in a program and in practice sessions. Strength creates power and can improve endurance, and is the number one necessity for a skater to improve and become consistent.

Through exercise, a muscle’s fibers become tighter and stronger, and can withstand more repetition for longer durations when asked to contract. Increases in strength can correlate with higher jumps, more stable landings, increased energy output, and increased ability to maintain a number of the spin variations required in the IJS.

<http://figureskating.about.com/od/officetraining/a/officedownes.htm>

## ***5.2 POWER TRAINING***

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This type of training, often referred to as plyometrics, includes various types of hopping, bounding, and jumping exercises which teach your muscles to generate more force and generate the force more quickly. The goal, of course, is to develop more powerful ‘push-offs’ when you are running. Reactive training fosters a high degree of strength in the muscles, tendons, ligaments, and bones, since the impact forces are usually higher than they are during regular running workouts.

Reactive training also stretches muscles, tendons, and ligaments vigorously, promoting greater elasticity and efficiency of movement. A key point to remember, though, is that reactive training cannot simply be plopped into your training routine without preparation. An effective training program is built on a foundation of general and running-specific strength training and must start slowly with low-level hopping and jumping. Otherwise, the forces generated during reactive training will create injured – not more powerful – parts of your body.

<http://iceskatingresources.org/StrengthTrainingBenefits.pdf>



### **5.3 PERIODISATION**

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The periodization of off-skate training:

Prioritising the goals of off-skate training requires that the skater, coach and conditioning specialist manipulate the fitness and training components so the skater is peaking at the appropriate time.

This systematic approach to training is called periodization of training. The purpose of an off-skate periodization schedule for skating is to provide the coach and skater with a realistic overview of the off-skate training year, prevent injury and overtraining and to encourage coaches and skaters to prioritise competitions so the skater is peaking at the appropriate time.

This could be expanded on from the doc

[http://www.usfsa.org/Content/parentsarticles/Sports%20Medicine\\_April%2097.pdf](http://www.usfsa.org/Content/parentsarticles/Sports%20Medicine_April%2097.pdf)

Nutrition

<http://www.healthline.com/hlbook/nut-figure-skating>

Provost-Craig, M., & Pitsos, D. (1997). Cardiovascular fitness and conditioning. Skating.

[http://www.usfsa.org/Content/parentsarticles/Sports%20Medicine\\_April%2097.pdf](http://www.usfsa.org/Content/parentsarticles/Sports%20Medicine_April%2097.pdf)

Poliquin, C. (2012). The Athletes Training Diary: A Classic Workout for Figure Skating. A Look at the training plan of of Canadian Champion Josee Chouinard. [http://www.charlespoliquin.com/ArticlesMultimedia/Articles/Article/260/The\\_Athletes\\_Training\\_Diary\\_A\\_Classic\\_Workout\\_for\\_.aspx](http://www.charlespoliquin.com/ArticlesMultimedia/Articles/Article/260/The_Athletes_Training_Diary_A_Classic_Workout_for_.aspx)