



Adam Lawrence is a 15 year old grade 10 student, and a member of the Cambridge Speed Skating Club. This determined young skater began his career on the ice at the tender age of three. Since that time, he has captured three Provincial Championships and 5 Provincial records in short track (in a hockey rink) and long track (on the long oval) speed skating. In February of 1999, Adam placed first in his age group at the North American Championships and came home with a North American record in the 3000 metre event, shaving 13 seconds off the previous best time. Adam's goals include fast-tracking through high school and qualifying for the National Team, to train at the Calgary Oval in 2002.

To achieve such success requires hours of training. Adam participates in cycling, dry land exercises (to build speed and endurance), as well as hours of work on ice to improve skating skills. During the 1999 year, this training began to cause problems with Adam's knees. The patellar ligament, which transmits the power of the quadriceps from the patella to the tibia, was inflamed and tender.

Further, the patella was not tracking correctly against the patellar surface of the femur. This can happen with over development of Vastus Lateralis (one of the quadricep muscles) compared to Vastus Medialis (another quadricep muscle). Adam's physiotherapist also identified medial knee strain, probably brought about by stress on the medial collateral ligaments during skating. Adam was advised to curtail weight bearing training activities for a period of time, to allow the inflammation to subside. He was encouraged to cross train in the water, and asked me to create an aquatic training program which would help maintain fitness while From this interview, the following objectives for class design emerged:

- Class length: 45 - 60 minutes (recreational pool temperature)
 - Mainly deep water, suspended activities to minimize impact
 - 20 - 45 minutes of cardiovascular activity to maintain aerobic conditioning
 - High intensity interval work included in the cardiovascular portion of the class, to maintain anaerobic conditioning
 - Avoid excessive knee flexion / extension to allow the knees to `rest`
 - (Hamstring jogormarch was especially painful for Adam) Use cardiovascular conditioning exercises which accomplished the
 - conditioning objectives without aggravating Adam's knees. *Moves which
 - worked well were: x ski (n, w, ski stop), skate ski, hip flexor kicks (n, w),
 - jacks, srt j'om
- Where possible, imitate skating movements

THE CLASS DESIGN

A typical class design follows:

Warm up: 5 minutes

Activities:

- 1/2 t & t n / w x country
- ski, ski stop 1/2 t n & w vert cyc, srt j'om (minimizing knee bend for both)
- 1/2t&tjj & xjj
- 1/2 t n & w hip kicks

Cardio: 20 - 45 minutes

Cardio exercises rotated between the following three activity sets. These were sometimes done in the order given, and other times, rotated randomly, depending upon how fatigued Adam became.

1. CALA exercises: All above CALA movements were included, and intensified by:
 - traveling
 - using more difficult hand and lever length options (flat hand, long levers)
 - using more difficult buoyancy
 - options (deep water, propulsive)
 - working against turbulence (ie: n hp k, alt scoop arms, travel fwd, propulsive)
2. "Skate Drill" - Adam was asked to imagine he was skating a 4 - 5 lap race at the rink. He would perform cross over turns on the corners of the imaginary pool oval, then sprint the straight away, trying to imitate as closely as possible the arm and leg actions he would use on the ice.
3. Additional work interval: Adam was asked to swim 4 - 6 laps, either crawl, or prone, holding a flutter board, doing a flutter kick with nearly straight knees, focusing on hip flexion and extension.



Muscle Strength and Endurance: 0 -10 minutes

The cardiovascular exercises selected were exhausting and required substantial muscular strength and endurance, so usually, specific MSE sets were not done. When MSE exercises were included, they were:

- 1/4 t rpt leg swings (narrow, sartorius, pendulum) with unison ski / pdl
- arms (chest deep)
- abdo jj with hug `n squeeze arms / jj
- arms / rev breast stroke arms
- anchored skate ski (chest deep) with
- unison rotator cuff arms
- tempo slant x ski: body is slanted about 30 degrees off vertical while maintaining correct postural alignment. All torso stabilizers must work.
- After a set slanted to one side, the activity is repeated, slanted the opposite direction.

Stretch: 5 minutes

- All key muscle groups used in the training session were gently stretched for a minimum of 15 - 30~ seconds.
- Special emphasis was placed on stretching tensor fascia lata by crossing the stretched leg behind the support leg (chest deep) and pushing the hip laterally, toward the side of the leg being stretched.
- For example: stand on the right leg; cross the left leg behind the right leg, resting the outside of the left foot on the floor; push the hips left, putting a stretch on the left tensor fascia lata.
- Quadriceps were gently and slowly stretched using a classic standing quadriceps stretch. Adam was able to hold onto his foot to assist the stretch.
- After some workouts, Adam spent extra stretch time in the hot tub, where he could sit and target the hamstrings effectively in warmer water.
- Over the course of three weeks, Adam replaced up to 3 of his regular training sessions with aqua personal training. As his personal trainer, my time was used to:



- Select exercises and design a training session which would meet Adam's objectives
- Instruct proper execution of all exercises
- Interact with Adam to screen out any exercises which caused pain
- Motivate adequate effort to create the desired intensity
- Coach Adam through all phases of the class, reinforcing correct alignment and intensity options
- Demonstrate and correct stretch technique to assure effective flexibility training



THE CONCLUSIONS

Adam is back on track after his aqua cross-training experience. The rest from weight-bearing activities allowed time for his aggravated patellar and medial collateral ligaments to heal. In the time since our training sessions, his problem has not reoccurred. It would be advisable for Adam to do a weekly pool session to reinforce the benefits gained from aquatic cross training.