

Developing a Yearly Strength Training Program for Ice Hockey:

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The goal for our program is to create logical and simple progressions that will improve overall sports performance. The key is preparation. We want to prepare our athletes over the course of a year, and ultimately over the next four years for competition and wellness beyond sports. There are several components that make up our yearly *strength* training program: biomechanical assessments, joint specific corrective exercises, core training progressions, improved posture awareness, and logical rep schemes that will get our athletes stronger.

We have implemented extensive biomechanical assessments over the past three years with my athletes that help the sports performance staff evaluate their progress and training age. It is humbling to look at your athletes joint by joint assessments to evaluate their ROM/postural deficiencies (goniometry measurements), muscle imbalance (manual muscle test), and core strength testing that measure endurance and postural control. These numbers are also standards which will hold your athletes accountable to their training, but it also holds you accountable to your program design. If you overlook something in your programming, then it clearly shows up during your testing. Looking at the test results from this past year has forced me to dedicate more time to lat and hamstring flexibility. We had enough athletes scoring poorly on their flexibility that we felt it was important to emphasize. We have compiled tests from across the board, looking at the research and tests published by Timothy Tyler, Stuart McGill, and Grey Cook, et al. These tests are performed twice a year to evaluate the athlete's overall athleticism, functional ROM, risk for injury or decreased performance:

Biomechanical Testing:

- **Overhead Squat Test – FMS**
- **Single Leg Anterior Reach**
- **Abduction/Adduction Manual Muscle Testing**
- **Biering Sorensen/Side Bridge Endurance Testing**
- **Leg Length – ASIS to Apex of Medial Malleolus**
- **Single Leg Broad Jump**
- **Internal & External Rotation – Measured both seated & prone**
- **Modified Thomas Test**
- **Lat/Hamstring Flexibility**

Right-Side Bridge / Left Side Bridge Endurance Ratio: > 0.5 (simply said, they should be pretty close to equal)

McGill suggests the RSB/LSB ratio should not differ from unity (1) by more than 0.05 (ie: the ration should be between 0.95 and 1.05). Outside, of these values the muscle balance is UNACCEPTABLE (within ACCEPTABLE)

Side Bridge: (either side) / Extension Endurance Ratio > 0.75

Therefore if this ratio gives a result less than or equal to 0.75 it is ACCEPTABLE: a ratio of greater than 0.75 is UNACCEPTABLE.

Anterior Reach: greater than 4 cm (or 1.5 inch) is flagged as significant

Greater than 4 cm has been shown to increase likelihood of ankle sprain in HS athlete.

Single Leg Hop: greater difference than 15% is flagged as significant

distance jumped correlated to body height not found in literature (yet)

Overhead Squat Test: - a score of zero should be evaluated and denotes PAIN. Those that score a 1, notes that the athlete could not perform an OH squat even with heel lift and their movement pattern or limiting factor should be evaluated and addressed.

Abduction/Adduction MMT: limited data exists but a greater than 15% has been flagged as significant

Our training objective is to create the strongest athletes possible and have no dysfunction or cross joint compensations caused by imbalance or posture. We don't want to see the joint position change or compensate during movements. In order to promote ROM we must improve quality postural control that includes the lumbopelvic hip complex, thoracic mobility, lumbar and scapular stability. We dedicate time during every warm up teaching our athletes how to improve lumbopelvic control in order to improve scapula posture, core control, and hip hinge. We want to make sure we have hip hinge and not allow increased ROM with Lumbar flexion. I want every one of my athletes to be able to maintain stability through stable joints throughout competition (as much as possible). Once the athlete's scores are within normal variance, we try and really push the weight. We must be strong, and once deficiencies are addressed there is nothing stopping us from making serious strength gains. At no point in our program do I stop trying to get my athletes stronger, however if my athletes score poorly in any of the biomechanical tests, then we must commit a portion of our total training time on correcting those issues. We still try and get stronger, but it must be done with correct movement patterns that will not reinforce the current dysfunction.

List of Strength Testing:

- **Grip Strength**
- **Vertical Jump – Just Jump**
 - **Bilateral**
 - **Unilateral**
 - **4 Jump Average**
- **Pull Ups**
- **Clean**
- **Squat**
- **Dead lift**
- **Bench**
- **Sprint – 10 YD, 20 YD, & 40 YD**
- **Pro Agility**
- **200 YD Short Shuttle – 10 Shuttles – all Under :40**

When we analyze the biomechanical test results we look very closely at the areas in which the individual or team scored poorly on. We will then prescribe corrective exercises individually or globally depending on the test data. We will emphasize the main corrective training goals with these movements. Strength and movement patterns must be grooved in order to ensure the primary movers are firing properly. We will keep the reps at around five for these movements and make sure the technique is perfect by prescribing less technical exercises.

The second emphasis is to improve strength endurance of the synergistic muscle to ensure that we have the endurance to support postural control, because fatigue is the same as instability. These exercises tend to be more technically complex but at a far lower intensity. For example, slide board to technical failure would be a good example of these types of movements.

The final corrective emphasis is on more dynamic exercises: movements that are technically challenging and are also very sport specific. We may have our athletes perform the Russian Box for power, but we are also looking for mechanical breakdown. Technique must always be perfect and keeping these exercise prescriptions simple is very important. I have rotated through the exercise weekly or bi-monthly in the past and it just does not allow the athletes to be technically proficient enough to achieve the desired stimulus. This part of our program is the equivalent to calibrating a stock car in the garage between races or time trials. We always do an extended warm up with these types of movements. We want to make sure we groove

proper muscle firing patterns prior to our athletes doing something high intensity – game, practice, or training.

I constantly educate my athletes about why this aspect is so important and how it will benefit performance. I have a great group of athletes who understand why they must master technique. If technique is not perfect, then we are not getting the desired stimulus. We are merely reinforcing dysfunction. I have not worked with many athletes that have not had some degree of dysfunction – we all have something. This is why we break down our main movements (Clean, Squat, Bench, and Dead lift) into progressions. If an athlete has a dysfunction that limits their ability to do any of these movements with near-perfect technique then we can alternate exercises based off of the limiting factor, even if that requires us to lower their training volume or intensity. We can make up for that lost volume with corrective movements (Husky Homework). The intensity and volume loss on the front end does not compare to what is lost later on if the issue gets worse or the intensity increase to a point where the dysfunction leads to injury.

Main Movement Progression

1	2	3	4	5
Box Jump	RDL	Rack Pull with Shrug	High Pull	Clean
1	2	3	4	5
Body Weight Box SQ.	Overhead Box SQ.	Assisted Squat	Front Squat	Squat
1	2	3	4	5
Goodmorning	RDL	Rack Pull	Trap Bar	Deadlift
1	2	3	4	5
Push Up	PB Push Up	Cable Press	DB Bench	Bench

Husky Homework

Scapula	Rotator Cuff	T Spine	Knee	Adduction	Abduction	Extension	Ankle
T,I,Y prone on t-ball	Standing ER/IR with cab	Lat Pulldowns	Abd squats with tband	Sumo Box Squat	Glute Bridge	Bird Dog	4 way t-band
D1/D2 with pulleys or b	S/L ER with dumbbells	Rows with cables or tbs	Squat jumps	Leg Scissors	Single Glute Bridge	Lsdiss w/ Dowel	Standing BAPS
Standing V-W-T with du	Standing flex,abd, scapt	Rhomboid set with head	Single leg squats	Ball Squeeze	Clams	Bridge	SLS heel raises
V-W on t-ball	Full Can with dumbbells	T,I,Y prone on t-ball	Unilateral S/L leg press	Lateral Slide Board	Anterior Reach	Bridge	BOSU heel raise
Scap Retraction with ca	Weighted abduction w/	Superman/Swimmers	Split squat jump cycle	Kneeling Slideboard Ad	DB RDL	Pull Through	Step downs
Alt. UE reach in prone o	Standing ER/IR with cab	Thumbs up T's on t-ball	Monster Walks	Lying Adduction	Elevated Front Split Squ	KB Swing	wobble board
UE Step-ups in plank po	Planks on airex or bosu	Bird dogs	Bosu Squats	Horizontal Adduction	Mini Bands	1 Leg Goodmorning	Ankle Mobility
Pushups alt with ball	Bilateral Overhead ball	Weighted Bird dogs	Lateral squats/ Lateral	Adduction/ Flexion	CrossBands	Sumo DL	
Bosu pushups	Alt. IR/ER with opposite	Bilateral D2 with cables	PB 1 Leg Wall Squat	Adduction Plank	Lateral Squat	Trap Bar DL	
Exploding Push Ups	Ball Toss to trampoline	T pushups on airex	Single Leg Dynadisc squ	TRX Adduction Plank	Keiser Abduction	DL	

These modified movements still provide a stimulus and strength benefit. Our main goal for our training is to develop as much strength as possible, but most important, to promote performance. To do this you must emphasize both strength development and injury prevention. A strong athlete is almost always better than one who is weaker, but a strong athlete with dysfunction is not better because they usually have more games loss due to injury. We want all our athletes to be able to squat 2x their body weight and clean at least 1.6x their body weight. We train to get stronger, but when we create a program, we look at what limiting factors will most influence individual performance. If there are issues that negatively affect performance and technique, then we must increase the attention we give those issues within our yearly program. The only way we can increase one aspect of our training is if we lower the total time commitment of another, and it makes sense to change the movements that are directly affected by a specific dysfunction.

Rep Schemes

	1	2	3	4	5	6	7	8
GPP	3x3	3x3	3x5	3x5	2x8	2x8	2x12	2x20
Tempo	55x5	55x5	55x5	55x5	33x3	33x3	22x2	11x1

Strength	3x5	3x5	3x5	3x5	3x3	2x3	1x3	1x3
Intensity %	70	72	75	80	82	85	87	92

Power	3x3	3x3	4x3	4x3	5x3	5x3	6x3	6x3
Intensity %	67	65	65	62	65	62	62	60

Power	Max Reps within Velocity .7 - .8 meter/second - Tendo							
	* Or Technical Failure							

Build Up	2x5	2x4	2x3	2x3	2x5	2x4	2x3	2x3
	2x3	2x2	2x1	2x3	2x3	2x2	2x1	2x3
	77	82	87	75	80	85	90	77