

Safely implementing an athletic training and multidirectional SAQ intervals for participants at various levels can present an enormous challenge. Life and sport performance are affected by a combination of both predictable and unpredictable movement patterns. Therefore, when managed properly, the inclusion of athletic movement is essential & appropriate for most clients. Athletic training can be prescribed to improve explosive 1st step quickness & Reactive Strength (Athlete), conditioning & coordination (Recreational & Physical Literacy). The final phase of athletic development are advanced plyometrics & reactive agility drills for athletes of all ages.



Ninja Athleticism

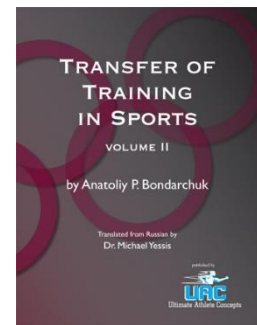
By definition, the word athlete implies an ability to move with skilled proficiency: *Ninja: Moving like a ninja involves learning how to travel stealthily and silently using many movements & directions*

ath·lete
(ăth'lē't')

n.

1. One who participates in physical exercise or sports, especially in competitive events.
2. One possessing the requisite strength, agility, and endurance for success in sports: *a natural athlete.*

Differently, athleticism suggest a set of abilities which are designed to generally transfer to life, sport, and in this case fitness. On the other end of the athleticism spectrum is sports specific training. Each sport has a specific set of skills designed to help achieve competitive success. specifically transferring to a sport or specific movement.



How's that impact fitness? Well, like sports, and natural athletes that seemingly have a set of skills easily, but moderately transferred to many specific sports, fitness is series of specific exercises, that have general movement foundations.

Each exercise like Bench Press & Push-up (push), Romanian Deadlift & Kettlebell Swing (hinge & grip), Mountain Climbers & Running (crawl/gait), Sprinting (a,b,c's) all represent foundational movements that help set them up for specific success. A house without a foundation = a straw house (i.e. 3 little wolves).

Therefore, when training for specific goals and or sports, it's essential that clients are progressed from functional movement "generalist" to sport specific athleticism

Science of Plyometrics

The purpose of plyo's for fitness is to keep clients "functioning" at a high enough level to participate in life and sport both randomly and efficiently. The purpose of plyo's for sport and fitness is similar, but the functional capacities are built out to the highest level safely possible and are specific to the client's goal or sport.

The Stretch Shortening Cycle (SSC): refers to a relatively fast action of muscle resulting from a muscle being stretched / loaded eccentrically immediately before it shortens concentrically. In order to sufficiently activate and take advantage of the stretch shortening cycle, the following physiologic mechanisms must be capable of working optimally. When mechanisms 1-3 below are functioning properly, a preloaded movement is more powerful than a non-preloaded / concentric only muscle contraction.

1. **Myofascial fitness:** the ability to activate and utilize the SSC / create ninja (i.e. full range, effortless & springy movement) via fascial elements 1) within the muscle 2) surrounding the muscle and 3) connecting one muscle to another,
2. **Muscle stiffness:** the ability to resist lengthening against external load,
3. **Proprioception:** the ability to your nervous system to relay information regarding joint angles, velocity of movement, load, and the position of limbs to other parts and your head relative to the C of G and environmental cues.

Rate of force development can also be achieved using other advanced training techniques. Depending on the client goal, they can be used to either enhance performance or increase metabolic demand of a training session. When fitness clients have been successfully progressed they should be 'P'repaired to perform the advanced training techniques like those below. If **ROM, load, complexity, fatigue and velocity** are carefully monitored these techniques can be safely integrated into most fitness client's programs.

Rules of Metabolic Conditioning & weight loss:

$W = \text{Force (F)} \times \text{Distance (D)}$; $\text{Power} = \text{Force} \times \text{Velocity}$; $\text{Velocity} = \text{Distance} / \text{Time(T)}$

To increase **metabolic demand, calorie deficit & heartrate** all of the above can or should be increased. *Higher heartrates* are indicative of more work being performed.

- i. Load / Weight (W): weighted vest, or external implements like kettlebells, Bulgarian Bags, ViPR's, sandbags etc.
- ii. Distance: The farther the weight or body moves, the more work (W) that is done. In that sense, increases in vertical or horizontal distance during SAQ & Plyometrics increase work
- iii. Velocity: more power (P) = more wattage, a measure of work. The same speed but using more weight = more power and metabolic demand.
- iv. Volume: doing more repetitions = moving load more distance. i.e. a 1km run is less volume and work than a 3km run.
- v. Full body movements: more working muscles & joint angle changes, especially if using a weight > than the weight a client could have used in isolation means more work performed / repetition. i.e. push press 80lbs Vs 60 DB shoulder Press.

Physical Literacy & Myofascial fitness: both aging adults who have lost function / healthy fascia and youth who have not achieved movement literacy need as much play & movement experience as possible. Although vigilant coaching & progression is required, everyone should perform a series of movements including multidirectional:

1. **Hanging, Rolling, Running, Crawling, Hopping, Jumping, Shuffling ...**
2. Should perform resistance training and ground reaction forces. The best way to prevent osteoporosis & low bone density is improved bone density as a kid.
3. Always focus on Technique, Vigilance & Proper Progression VS capacity when training these populations
4. Youth do not have well developed sweat glands, so do not use it as an indicator of intensity or heat exhaustion.
5. There is a speed / muscle fiber adaption window between the ages of 5-7. SAQ & movement literacy will help ensure this imp window for endurance - athleticism is achieved. Everyone has a pool of Type IIab muscle fibers. The specific type of activity performed in this phase will greatly impact if these fibers exude aerobic (type 1) or anaerobic (type 2) traits.
6. Youth do not have well developed anaerobic metabolism. Perform longer work to rest intervals (best in the form of play – games – repeated sport skill activity)

Play / Adult Recreational Clients (ARC)

- i. *Foundations* are imp. build movement **capabilities** (i.e. dynamic postural assessment, corrective flexibility coordination, neutral spine & stacked joints, landing stabilization / transitional balance) before capacities (i.e. strength and power).
 - a. *Technique:* be certain to instruct successful & safe execution of the specific SAQ (arms, hop, jump, shuffle, bound...) and FAST (hinge, squat, lunge, push pull chop ...).

- b. *Instruction / Cuing*: the simplest way to teach and still create a fitness challenge / metabolic demand is instruction via Dyn. warm-up.
 - c. Only advanced – high function fitness clients attempt to maximize power. 90% of maximal speed is typically the max speed of prescription for ARC.
- ii. Test capacity (broad & vertical jumps, lateral bounds, med ball push, repeated 2ft hops, 1ft hops, nF3 fittest) before assuming capacity.
- iii. **Build capacity** & conditioning *systematically* and scientifically. When a person's conditioning improves they recover more quickly between repeated bouts of exercise (i.e. between sets & reps of SAQ, resistance training sets, workouts). Both longer and shorter intervals create specific adaptations that support improved conditioning & V02 Max.
- a. Both longer & shorter intervals have been shown to have the greatest impact on aerobic capacity. Longer are a great start point & safer due to avg speed of movement. They are more dangerous due to fatigue...stop interval when form changes significantly.
 - b. Shorter intervals have been shown to have a large impact on aerobic conditioning & anaerobic power in a short period of time.
 - c. Alternate lower body & upper body dominant movements.
 - a. 1:2 work to rest ratio before same movement
 - i. Ladder Drill – Battle Rope
 - ii. Resisted Running – Push-up
- iv. *Challenge* fatigue resistance & conditioning w SAQ & Athletic Strength circuits and progress the following
- a) shorter work to rest intervals (i.e. 1:3 (20s:60s) → 1:2 (20s:40s)
 - b) longer anaerobic capacity / glycolytic intervals i.e. 30s → 45s → 60s) or
 - c) more work in the same interval (i.e. 40→50 whips, 10→12 burpees, 1.5 → 2 lengths of the speed ladder in 20s)
 - d) combine mini circuits (i.e. Combine SAQ 1a SAQ 1b Bal 1 w SAQ 2a SAQ 2b Bal 2)

Pro Progression:

- Prescriptions should always follow proper progression of the NASM OPT Model.
 - Stability → Max Strength → Power.
- Resistance training typically starts with high intention slow V (Max Strength) & progresses towards lighter load high velocity training (Power) performed through the entire range of motion (Baker & Newton, 2005, S & C, 27(6), P. 24). Refer to the Periodization of Strength for more info.
- Regardless of phase, once technique & coordination are sufficiently improved, always attempt to move weight as fast as possible.

- All energy systems (ATP-PC, Anaerobic Glycolysis, Aerobic Glycolysis) must be trained, with a specific emphasis on V02 Max (for recovery) and sports specific application energy system requirements.
- The arms drive the legs. Include the **Upper Body**: try not to automatically think run, jump, hop but the upper body and terms like whip, throw, toss, swing, punch, strike

Strength will lead to improved control of posture, stopping = eccentric loading, ligament & tendon strength, transitional joint stability = transitional balance & power initiation = concentric contractions. Together these strength / muscle qualities will:

- Improve the ability to change direction in multiple planes.
- Improve a person's quality of life
- Decrease the risk of injury
- Decrease the transition time & movement efficiency during plyometrics
- Increase reactive stability to unplanned stimulus.

Flexibility: dynamic & 'explosive' 360 ° should prepare the participants for the type, complexity, speed, intensity and specificity of the class, game or practice. See 'dynamic warm-ups' for more info. Post exercise recovery should be focused on 1) relaxing heavily stressed tendons and muscles, 2) restoring parasympathetic function (i.e. nutrient flow to the periphery) and 3) restoring muscular balance and symmetry.

Guidelines for Prescribing SAQ / Plyometrics

- Low Complexity → High Complexity
- Low speeds → High speeds
- Low Coordination / Complexity → High Coordination / Complexity
- Low Load → High Loads
- Low volume of work (Fx. D) → High volume

SAQ & Plyo's Specific

- Low # of jumps / reps / time → High # of jumps / reps / time
- Planned → Predictive → Unplanned Reactive
- Non-Competitive → Competitive
- Low Distance / Height → High Distance / Height
- Longer Intervals & Rest → Shorter Intervals & Rest
- Non-Fatigued → Fatigued

Train Like an Athlete: Move Like a Ninja

Chad Benson MSc, CSCS, CPT & Gareth Bryson, Head Coach UFCGyms

***Always master technique before progressing → ***

Rules of SAQ:




(P)ower = (F)orce x (V)elocity; Velocity = Distance / Time. P can be improved by:




1. Establish mobility, stability & myofascial fitness before increasing P
2. Strengthen to improve the **F** of a muscle
3. How to Increase **V**? Cover the same distance (D) in a shorter period of time (T) or more distance in the same period of time.
4. Teach landing consistency (land in same place), efficiency (land softly) & stability 1st (ankle, knee, hip alignment & torso angle).
5. This progression of speed is essential to prevent injuries.

Vigilance and Assessment:




Constant visual **assessment**, **corrective cuing** and **progression** can in fact, allow recreational athletes to maintain and improve performance during a life period typically associated with increasing obesity and decreased neuromuscular coordination. SAQ training is more than a few fast feet and plyometric drills, it is complete paradigm designed to stimulate metabolic pathways, improve athleticism and daily function.

Athletic Performance Assessment Protocol

2ft Broad Jump	Protocol	Data & Scoring
<p><i>Purpose:</i></p> <ul style="list-style-type: none"> This tests plyometric / SSC explosive power mainly through the lower body triple flexion and extension. Explosive lower body power is essential for sport and preventing functional loss with age. <p><i>Set-up:</i></p> <ul style="list-style-type: none"> Mark start line with tape. Lay tape measure perpendicular to tape beginning at start line. Client starts with toes on but not beyond line. 	<ul style="list-style-type: none"> Each athlete will be given 3 attempts. Additional attempts can be given if the athlete's jump distance continues to increase. Stand with feet shoulder width apart directly behind reference point line. Using only a counter movement (no step in), the client loads into a partial squat while drawing / loading the arms behind body. Powerfully straighten both legs and drive the bent arms & body forward. Athlete should try to execute a stable landing (no stutter jumps), but will be measured from the point of closest heel contact back to the line. On landing, if there isn't a back step (non jump), place a clipboard directly behind heels and take measurement. 	<ul style="list-style-type: none"> Maximum horizontal distance achieved measured in meters and recorded to two decimal places (eg. 2.54m). 2 trials will be given. <p>Level 1: Level 2: Level 3:</p> <p>___ Total distance in meters ___ Level scored</p>
<p style="text-align: center;"><i>Start</i></p> 	<p style="text-align: center;"><i>Finish</i></p> 	<p style="text-align: center;"><i>Finish</i></p> 





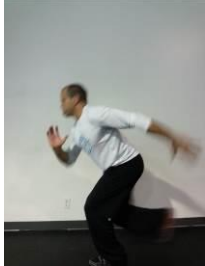
Lateral Bound	Protocol	Data & Scoring
<p>Purpose:</p> <ul style="list-style-type: none"> This tests the power of the lateral movement of the lower body, mainly quadriceps, hamstrings and gluteals. The lateral bound also tests ankle stability and hip-knee-ankle alignment. A lateral bound test is used instead of the traditional vertical test as it is more sport specific for lateral change of direction sports. <p>Set-up:</p> <ul style="list-style-type: none"> Mark start line with tape. Lay tape measure perpendicular to tape beginning at start line. 	<ul style="list-style-type: none"> Standing on the trail / back foot with instep / inside of edge foot on the tape line. Non-bounding front leg remains off the floor for entire test. Quickly drop down to load the bounding leg for increased power. Wind up arms back and across the body and bound laterally (without hip rotation). Must have a stable front foot landing (the back foot bounding leg cannot touch down at a shorter distance). 	<ul style="list-style-type: none"> The distance will be measured straight out from tape to the closest part of the landing foot. 2 trials per foot will be given. Maximum horizontal distance achieved measured in meters and recorded to two decimal places (2.54m). <p>Level 1:</p> <p>Level 2:</p> <p>Level 3:</p> <p>___ Total distance in meters R</p> <p>___ Level Scored</p> <p>___ Total distance in meters L</p> <p>___ Level scored</p>
		



Purpose: this test measures upper body (arm) strength and explosive power. This test would be suitable for any sports in which upper body strength is important, such as rowing, hockey, football, baseball, tennis.

Seated or Kneeling Medicine Ball Push Test	Movement Error(s)	Scoring
<p>Equipment required: 6 (female)-12lb (male) medicine ball, wall, tape measure</p> <p>Set-up & Procedure:</p> <ul style="list-style-type: none"> -the athlete sits on the floor with his legs fully extended, feet 24 inches (~60 cm) apart and the back against a wall or pole. -The ball is held with the hands on the side and slightly behind the center and back against the center of the chest. The forearms are positioned parallel to the ground. -The athlete throws the med. ball as far straight forward as he can while maintaining the back against the wall. The distance thrown is recorded. -The distance is measured directly from the wall to the area of landing area nearest the tape. - The athletes is given 3 trials with the best recorded. 	<ul style="list-style-type: none"> Upper body moves away from support prior to MB release Excessive shoulder elevation L or R arm dominates the throw (may see unequal flaring of elbows) Knee not tracking over toes 	<p>Male: 12lb</p> <ul style="list-style-type: none"> Level 0 = pain or below 2.5m Level 1 = 2.6 – 3.5m Level 2 = 3.6 – 4.5m Level 3 = 4.5+ <p>Female: 6lb</p> <ul style="list-style-type: none"> Level 0 = pain or below 2.0 Level 1 = 2.1 – 2.5m Level 2 = 2.6 – 3.0m Level 3 = 3.1m + <p>_____ Distance in (m & cm's)</p> <p>_____ level obtained</p> <p>-If this movement is painful to complete assign a 0. Otherwise, assign the # associated with the best successfully completed attempt.</p> <p>-If neither level is successfully obtained refer to P2P1&2 for Split Squat</p>
		

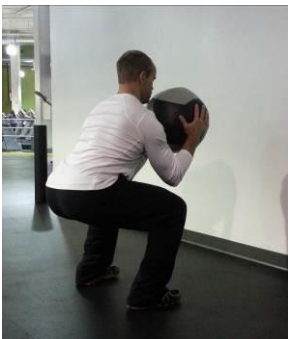



Green	Beginner
Orange	Intermediate
Red	Advanced







Plyometric Movement Progression Matrix:

<p>2ft Jump Squat</p>	<p>The vertical jump is the most assessed and sought after athletic quality. A horizontal version of the 2ft vertical jump squat is the broad jump. An athlete's ability to perform this skill is closely related to their acceleration, top end speed & COD capabilities. Multidirectional or 1ft jump squat training is advanced and rarely should not be used with adult recreational populations.</p> <ol style="list-style-type: none"> 1. Always teach deceleration & transitional stability before take-off. 2. Look for the capacities to softly absorb the ground and maintain great postural control of core, hip, knee. 3. Watch for shifting of hips & preferential loading (in this pic1 towards L leg) 4. See Also Drop Squat Progression http://www.youtube.com/watch?v=1GsZHKilZVo 		
	<p>L -Touch Drop & Stop Squat</p>		<p>1ft Jump & Land</p>
		<p>Left Pic: When outside ft. are near parallel to rungs and flat footed and the end of absorption.</p> <p>Right Pic: An increase in Fwd. torso angle is normal. Partner secures resistance band 12-18" behind participant</p> <p>A variation that improves hip ext.& glute recruitment requires the arms to start high and drive low & behind during take-off.</p> <p>Attempt to max hip ext., arm drive to shoulder height and toe point the take-off. Reach toes & absorb ground in toe heel strike pattern</p>	
	<p>High Knee March or Skip</p>	<p>Bench Power Step-up/Jump</p>	<p>1ft Jump & Land</p>
<p>Skip / Jump Squat</p>	 <p>Reach heel fwd. with ankle dorsiflexed. Attempt to build speed & distance w each push</p>	 <p>Continuous combination of horizontal and vertical drive. Consistency & balance are imp.</p>	 <p>Reach heel fwd., sink into a partial squat in order to transfer power from horizontal to vertical, drive off big toe, fully extend hips & land softly</p>

<p>Lat Bound</p>	<p>Linear bounding is a progression of skipping and is very important for all athletes which require high levels of speed and off the line power. For the purposes of COD athleticism lateral bounding is a progression of hopping, lateral running & cut running. Specifically, this movement pattern is an explosive expression of the stride used in ice skating sports.</p> <ol style="list-style-type: none"> 1. Load into partial single leg squat with a diag. arm drive pattern. Shift weight in direction of intended movement & take-off. 2. The landing is the most imp portion of this exercise. Be certain to land softly. 3. In prep for landing reach the lead and pronate the ft. to reduce the risk of injury. NB the arm drive is across the body on a diag. 		
	<p>Reach & Glide</p>		<p>Bound Bound Freeze</p>
		<p>Left Pic:</p> <ol style="list-style-type: none"> 1. Sit as deep as possible w good posture, knee & hip stability 2. During the reach keep all your weight on the trail leg (i.e. knee hip & ankle should remain stacked) 3. During reach, dorsiflex & evert ft. such that inside edge of ft. ends up making contact w the floor 4. Without vertical C of G displacement glide onto the reaching leg. Establish stack, TB and repeat 	

Developing Athletic & Reactive Strength

		<p>MB Partner or Wall Squat & Press</p> <p>-load into squat, until pt of spinal posture change or elbows touch thighs -simul. tighten core, straighten arms, twist wrists & powerfully triple extend hips to perform a jump squat - release ball towards the MB, softly absorb the ground in prep to receive the MB and reload the squat</p>	
		<p>MB Prone Drop & Stop Push-up</p> <p>Create a long slightly flexed (core hollow position) torso with a long neck & turtle head in shell</p> <p>Drop hands off ball and attempt to land as softly as possible without shoulders elevating, chest touching ball or back arching</p> <p>X reverse direction & catch side/top of ball w straight arms</p>	

		<p>MB Lat Stop & Go -Power Over Push-up</p> <p>1hand on floor other on top of but towards the opp. side of the MB. The outside hand pushes you lat. While the MB pushes vert. Place both hands on top, pause & softly load the other arm. Pause again on the other side & repeat. Only remove the pause when a part. Can safely perform 4-6 reps of stop & go.</p>	
<p>Rot. Push Slow SSC</p>		<p>MB Partner Long Wall Rotating Chest Press</p> <p>Set distance from the wall as far as possible to receive ball at shoulder height w a high elbow</p> <p>Load leg farthest from wall. Explode up & towards front leg and wall</p> <p>Simul. Extend arm, rotate torso and quickly follow through to the opp side</p>	
<p>Rot Push fast SSC</p>		<p>MB Partner Short Wall Rotating Chest Press</p> <p>Same as above but closer to wall, w quicker shorter rotation and follow through.</p> <p>The objective is min transition time while still generating decent ball velocity</p>	

Progression & Suggested Programming

1. *Warm-up:* Core ACTivate, mobilize, stabilize
2. *Warm-up:* with a controlled pace, introduce & rehearse movements the client will need to train & play. must perform a general dynamic and specific dynamic warm-up before performing complexes.

Revvng the metabolic Engine

- Work hard, rest hard works best
- Low level cardio = fat mobilization, high intensity cardio = fat burning while resting
- More muscle = greater metabolic demand = strength before power
- Use HR to guide your workout. Recover **60% - 70%** of MHR between sets & between **80 & 95%** during work.

Practical considerations & execution

- o *Warm-up:* Activate, stability & integrate core myofascial slings (not shown)
 - o *Warm-up:* with a controlled pace, introduce & rehearse movements the client will need to train & play. Finish w easy – advanced reaction drills (based on current fitness level)
 - o Phase 1 can be achieved by most recreationally active adults but not the inactive. Master Ph 1 techniques & min mechanical breakdown before progressing to Ph 2.
 - o **Reaction** skills are divided into planned, unplanned & head to head. During unplanned drills, the client has to react to a coached directional cue. Head to head drills are highly advanced and require a partner who is on offence or defense.
 - o **Intensity:** Low speed, min complexity, short distances, short time, small amounts of work are low intensity, high speeds, higher complexity, large distances etc. are high intensity.
 - o **Directions:** this is a multidirectional paradigm so all directions of movement are appropriate if performed and progressed to the level of the participant. All + indicates movement & directional combinations (like fwd. hop & lateral bound or fwd. hop & diag. hop) & unplanned reactions.
- Rx*
- o *Suggested 8 Week Rx:* Weeks 1-2, 2sets of ladders (lower), med balls (upper) & recovery separately, Weeks 3 & 4 2x ladders + med balls + recovery. Repeat for Phase 2 programs and or link battle and cone drills to create longer phase 1 MetCon sequences.
 - o *Option B:* 1 group ladders (set time), another group med balls, both recovery exercise.

Drill Inventory

Core Activation	Rolling (10 min)
Supine Knee to Chest March	V-sit to Seal Roll https://youtu.be/wfSTMYIFfSU
Reach & Rotate	Glute Bridge > Standing rotation https://youtu.be/qNgScDDE8oU
Fwd Bwd Kneeling Groin Stretch	Butterfly Roll https://youtu.be/STI-be6Hylo
90/90 Series w Hip to Hip Knee Drops	Ido Portal Shoulder Roll https://youtu.be/DD0Y2U7GAZw
Side Plank Hip Drive Top Leg March	Forward Backward Roll https://youtu.be/lulzm26TiNI
Stepping Plank & Table Top	Shrimping https://youtu.be/96Psuu7Y7EY
	Transitional 2-point Plank
	Scorpion https://youtu.be/N7yC18gbk0I

Dynamic WU & Ladder Drills: 10 min

Low Intensity: <https://youtu.be/c4MkaCFrt1E>

Medium Intensity: https://youtu.be/GcYP_MJwLQ

Plus: Side Crawl & Crab Walk

Sprint Drills: 15 min

Low Intensity: <http://ow.ly/tlsK30esqLJ>

Medium Intensity: <http://ow.ly/nzGw30esqRp>

High Intensity: <http://ow.ly/1vJH30esqYC>

Plus: Resisted Side Crawl, Bear Crawl

Slam / Wall Ball Drills:

<https://www.youtube.com/watch?v=pCFnvyVDrJw&index=2&list=PLfeSIZopW8quhnQVw4PR9Ca27sqQDIjST>

<https://www.youtube.com/watch?v=6JDFzxTQGjE&list=PLfeSIZopW8quhnQVw4PR9Ca27sqQDIjST&index=3>

https://www.youtube.com/watch?v=woX5K4aGZ4w&list=PLfeSIZopW8qv_vqxfoD_nLtMbi15klnW&index=2