

Designing an Effective Training Program

An old theory is revolutionizing the way we embrace Performance. Darwin's theory of evolution is evident in the athletic world. Terms such as natural selection, and the survival of the fittest, have lead athletes to look for new answers. Science 101, due to competitive environmental conditions, a species was prone to mutate in order to possess certain traits that allowed them to survive in their environment. Species that did not possess certain survival characteristics became the extinct. This is still true today! These new species have achieved new characteristic traits from the phenomenon of strength and conditioning. These new species participated in a training regiment to maximize their skill and talent, and to create a mental attitude of excellence. Would you like to become this elite species?

The 10 Principles for designing an effective training Program

Know your weakness. Knowing your weak areas before you begin an exercise regiment will ensure proper directed training. On a strong foundation the builder built the house. A strong foundation means proper posture, efficiency in various movement patterns.

Integrate abdominal conditioning. In order to achieve competency in this area, proper activation of the abdominals must be used.

Train specific. This requires using activities that are similar to your sport environment This requires that the activities mimic similar movement speeds, and train similar energy systems as in work or performance.

Use exercises that require multi joint stimulation. The sensory and motor requirements, for high level performance is very complex. Therefore we must chose exercises that challenge and stimulate our central nervous system. Activities that integrate a wide variety of movements are beneficial for achieving this task.

Use ground-based closed chain activities. In most sports the majority of the battle occurs on the feet. Therefore to honor the principle of specificity we also must train on the feet. This will insure that there will be a high carry over from training to performance.

Concentrate on Technique. To ensure safety we must follow perfect form. Every time you practice perfect your body will learn to do it right. After a while the moves will become automatic and this will reduce our response time and increase performance carry over.

Train continuously. Top competitors work from a solid foundation "training is more important than talent" Long lay offs will ensure detraining of the athlete current level of preparedness.

Implement the principles of Periodization. A well structured training program should be followed measuring progress to optimize result. This is especially important for seasonal sports.

Work on mental toughness. Mental resiliency and motivation is more important than talent.

Avoid pain. Never do activities or continue a particular exercise that creates pain. This may lead to long term injury or a faulty movement pattern.

Periodization: The process of planning your training

Periodization is the process of planning your training session in a way that allows you to achieve high-level performance. Some sports such as football can benefit from a yearly plan. This yearly plan can be broken up into smaller units that concentrate on specific areas). When training for activities that have a certain training focus, more time would be spent through the plan improving this area. Individual requiring a lot of strength would have more strength phase in their training program.

The process of effectively manipulating the intensity of a load to induce positive adaptation is a necessity for short and long term improvement in performance. Choosing a load not only produces adaptation from induced stress on the musculo-skeletal system. It also teaches the body to adapt to stressful situations. Maximal load create a higher heart rate response than lower resistance. As the body begins to accommodate, becoming familiar with a particular load the heart rate response is not as pronounced. Appropriate loads and challenging exercises can stimulate the body to achieve optimal performance by reducing thinking and anxiety

The simplest method of determining an appropriate rep range is training within the upper and lower limit of an established resistance zone. If strength is our zone, any load allowing an effort of 85% your one rep max for 6 reps would be acceptable. An individual starting with a load, which allows a maximal effort of 6 reps, would try to become comfortable with this load (accommodation) before increasing the resistance.

Two principles must be utilized to master and perform this skill. The first step is to know what fundamental is trying to be achieved e.g. strength, power, and endurance intensive (fig 2.2). This allows us to determine an appropriate training range. The next step is to determine the sub max load associated with that range. This is determined by testing you 1RM and calculating sub-max totals, or your sub max test could be performed and a 1RM could be determined to calculate the appropriate training loads. For example if muscle power was the goal for this training phase the rep range would be between 1-5 reps. now an approximate 8 rep max would be determined. The final step is establishing the training weight as shown in figure 1.2. Back off weeks are sometimes use to allow super-compensation to take place. This allows the athlete to recover mentally and physically from intensive bouts.

Fig 1.2

	Week1 Heavy	Week 2 Light	Week 3 Moderate	Week 4 Heavy	Week 5 Back off
Intensity	Testing	80	85	90	75
Sets	4	4	3	5	2-3
Load	275	220	234	248	206
Reps	1	5	4	3	3

Program Training Phases

Fig 2.2

Training phase	Objectives	%Max	Reps	Sets	Rest
Rest	Recover from previous Training Phase. Regain mental alertness	50-75%	Depends on goals	1-3	2-3 min
Base (4-8 weeks)	Improve work capacity Increase aerobic capacity	50-70	8-12	2-3	1-2min
Endurance Extensive (4-8 Weeks)	Activities that are low intense in nature and maintained for an extended amount of time. E.g. 10k run	30-40	30-100	2-3	30s-1min
Endurance Intensive (4-8 weeks)	Activities that are between 60 seconds and 3min e.g. 800 meter run	55-65	12-20	2-3	30s-1min
Hypertrophy (4-8 weeks)	Increase muscle mass Variety of Movements Same muscle groups worked together	65-85	6-12	3-6	30s-1.5min
Beginner Strength	Designed for beginning athletes who can not handle heavy loads	65-80	8-12	2-4	2-3 min
Strength (4-8 weeks)	Develop strength Develop speed, agility	85-90	6	2-6	2-5min
Power (3-6 weeks)	Multiple effort	75-85	3-5	3-5	2-5min
Power (3-6 weeks)	Single effort	80-90	1-2	3-8	2-5min
Combination (4-8 weeks)	Usually combined during peaking. Speed, agility drills are combined linking various movement patterns.	70-90%	Depends on goals		2-5 min

How much strength do I really need? This depends on the amount of strength required in performance. Most sports do not express absolute strength due to the nature of the performance task and force generated time constraints. Strength gains that are achieved above this level may be none transferable to performances. When using resistance training to create positive adaptation no more than 10% of the training weight should be used when similar movement patterns are used. For accessory lifts used that are not as similar to the desired exercise a variance of 20 % may be adopted. Note figure 1.3a. This method of load manipulation will ensure adequate recovery, and will maintain the appropriate speed and mechanics to ensure progress.

Fig 1.3a

Exercises	Clean	Pulls	Dead lifts
Variance of training weight		10%	20%
Load	200 lbs	220 lbs	240 lbs

Annual Plan for Sports

Football

Month	Dec	Jan	Feb.	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
Period	Off season						Preseason			In season		PO
Phase	R	B	S	B	S	B	S	P+ C	R	M	M	M
Phase	R	B	S	PO	AR	B	S	PO	PE+ C	R	M	M

Hockey

Month	Dec	Jan	Feb.	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
	Competition		T	Preparation				T	Competition			
Period	In season		Off season			Preseason			In season			
Phase	Strength	Power	T	base	strength		P	T	Base	Strength		T

Goals during Each Phase of Training

▪ Off season

Base (3-6 weeks)

Goal to improve work capacity, coordination, and muscle mass

- Low to moderate intensity, High volume
- Concentrate on weak areas,
- Concentrate on stretching tight areas

Strength (4-8 weeks)

Goals to build strength on base

- Strength development
- Range 6 reps at 85% or greater
- Beginner athletes use 8-12 reps between 60-85%
- Explosive lifts are introduced (On day 1 and 3)
- Intensity begins to increase
- Develop speed and agility, reflexes

Power (3-8 weeks)

Goal to peak off strength phase and get ready for season

- Peak speed agility and power and include the Combination phase
- Rep range (Power 3-5) or (1-3 reps)
- Maintain skills

- **In season (Duration of competitive season)**

Goals during in season are to maintain your skills, strength and size. Improve knowledge of game and increase sport specific endurance.

- **Active Rest or Transition (1-4 weeks)**

Goals during this phase are to give the body a break mentally and physically. Active the athlete should choose other low intensity activities to participate in. This phase should be included before and after the competitive season. This promotes an increase in focus during the in-season.

Running Program

Always begin the running program with 3-6 reps of dynamic warm up. On speed days choose between 5-10 activities from acceleration, speed and ply metrics. On agility days choose 5 - 10 activities (Perform no more than 5 reps each individual drill). After mastery of a drill has been achieved, chose another drill to improve on. Using a wide variety of drills will allow you to achieve competency in a variety of playing situations.

Off season

Base (3-6 weeks)

- Light running (aerobic)
- Low intense plyometrics and agility

Strength (4-8 weeks)

- Speed and agility introduced
- Increase the intensity of plyometrics
- Speed endurance, aerobic conditioning and lactate training (These activities are performed at the end of agility training if these energy systems are required in your sport.

Power (3-6 weeks)

- Reduce speed endurance, aerobic conditioning and lactate training
- Integrate over-speed training

Running Consideration

Resisted running – Make sure resistance still allows proper drive

Over speed training

- Must be performed before speed or acceleration drills
- Between 3-6 repetitions
- If using a downhill no more than a 4% decline
- Valuable during power and peak phase

Ins and outs

- 5-20 meter acceleration zone
- 10-20 meter in zone (hold breath and run as fast as you can)
- 10 -20 meter out zone (exhale and maintain stride frequency)
- improve by increasing in phase and decreasing out phase
- improve by increasing the number of peaks

60 meter distance for a 100 meter runner

20 m acceleration	10 meter In	20 m Out	10 meter In
50 meter course			

35 meter distance for a football player

5 m acceleration	10 meter In	10 m Out	10 meter In
50 meter course			

Putting it all together form A-Z

Name: _____ Date: _____

Training questions

- What activities do you participate in _____ pos. _____
- How long have you been involved in these activities _____
- How long do you plan on participating in these activities _____
- What type of training have you had in the past _____
- What was the intensity of your training _____
- Do you have or had any previous injuries _____

Annual plan

Month	Dec	Jan	Feb.	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
Period												
Phase												

Important dates

Date	Activity

The training program checklist

Performance parameter	Rating out of 10
Cardiovascular	
Strength	
Nutrition	
Mental Conditioning	
Flexibility	
Sport specific parameter	

Physiological	Biomechanics	Training phases and methods

Exercise Selection

Core	Assistant	SAQ	Stability

Performance Evaluation

Dates				
10 yards				
40 yards				
Fly 40				
80-120 yards				
30 meters				
60 meters				
Pro agility run or line drill				
Vertical jump				
Horizontal jumps (ft)				
5 bounds				
Max clean				
Max squat				
Max bench				
Pull ups				
Push ups				
Shuttle (20/300)				
Vo2 max 1.5 mile				
Choose the test that match performance Hockey Football Field spots Track and field Other				

THE PROGRAM

Weekly Structure

This is the suggested split to improve your speed and stretch during a week of training.

Day	Day	Day	Day	Day	Day	Day	Day
Intensity	Hard	Hard	Rest	Light	Light	Rest	Rest
	Explosive	Strength		Explosive	Strength		
Speed /agility	Speed	Aerobic	Option (run)	Speed	Lactic	Option (run)	

Exercise Programs for each Phase of Training

Always train power movement first

Change a few exercises every 3- 4 weeks

Base Training

Monday and Thursday				
Exercise	Week 1	Week 2	Week 3	Week 4
Clean dead lift	3* 5-8	3* 5-8	3* 5-8	3* 5-8
Chest exercise	3* 8-12	3* 8-12	3* 8-12	3* 8-12
Standing Shoulder press	2* 8-12	3* 8-12	3* 8-12	2* 8-12
Push ups/dips	4*max	4*max	3*max	none
Shrugs	2* 8-12	3* 8-12	3* 8-12	2* 8-12
Abdominals	2 or 3 activities from abdominals (light) or Swiss			
Tuesday and Friday				
Squat	3* 8-12	3* 8-12	3* 8-12	2* 8-12
One leg activity	2* 8-12	3* 8-12	3* 8-12	2* 8-12
Pulling exercise	2* 8-12	3* 8-12	3* 8-12	2* 8-12
Pulling exercise	2* 8-12	3* 8-12	3* 8-12	2* 8-12
Wide Grip curls	2* 8-12	3* 8-12	3* 8-12	2* 8-12
Drags or one leg pulley	Front, and backward walk and side drags -20m distance			
Stability	Internal and external rotation			
Abdominals	Choose 2 or 3 activities from abdominals			
Stability and Abdominal training				
<ul style="list-style-type: none"> ▪ Drills to improve posture ▪ Abdominal work/pillar ▪ Low intensity running (aerobic conditioning), and skipping 				

Hypertrophy Training

Monday and Thursday				
Exercise	Week 1	Week 2	Week 3	Week 4
Chest Press	3* 5-8	3* 5-8	3* 5-8	3* 5-8
Chest exercise	3* 8-12	3* 8-12	3* 8-12	3* 8-12
Chest /Back	2* 8-12	3* 8-12	3* 8-12	2* 8-12
Back Exercise	2*8-12	3*8-12	3*8-12	2*8-12
Back exercise	2* 8-12	3* 8-12	3* 8-12	2* 8-12
Biceps	2*8-12	3*8-12	3*8-12	2*8-12
Abdominals	2 or 3 activities from abdominals (light) or Swiss			
Tuesday and Friday				
Squat movement	3* 8-12	3* 8-12	3* 8-12	2* 8-12
Leg Exercise	2* 8-12	3* 8-12	3* 8-12	2* 8-12
Leg Exercise	2* 8-12	3* 8-12	3* 8-12	2* 8-12
Shoulders	2* 8-12	3* 8-12	3* 8-12	2* 8-12
Shoulders	2* 8-12	3* 8-12	3* 8-12	2* 8-12
Triceps	2*8-12	*8-12	2*8-12	2*8-12
Stability	Internal and external rotation			
Abdominals	Choose 2 or 3 activities from abdominals			
Stability and Abdominal training <ul style="list-style-type: none"> ▪ Light days replace Some Back exercises with biceps ▪ Light days add additional triceps work ▪ Light plyometrics ▪ Low-moderate intensity running (Repetition or speed endurance) 				

Strength training

Monday and Thursday				
Exercise	Week 1	Week 2	Week 3	Week 4
Hang or full cleans	4*rep	3*rep	2*rep	Retest
Snatches	3* 5-8	3* 5-8	3* 5-8	3* 5-8
Push press	2* 8-12	3* 8-12	3* 8-12	2* 8-12
Chest exercise	4* 8-12	3* 8-12	2* 8-12	1* 8-12
Shoulder press	2* 8-12	3* 8-12	3* 8-12	2* 8-12
Abdominals	2 or 3 activities from abdominals (light) or Swiss			
Tuesday and Friday				
Squat	4*rep	3*rep	2*rep	Retest
Overhead squats or Option	2*6	3*6	3*6	2*6
Pulling exercise or pulls	3* 8-12	3* 8-12	3* 8-12	3* 8-12
One leg activity	3* 8-12	3* 8-12	3* 8-12	2* 8-12
Pulling exercise	4* 8-12	3* 8-12	2* 8-12	3* 8-12
Barbell curl	2* 8-12	3* 8-12	3* 8-12	3* 8-12
Dynamic ROM	Upper body stability or ROM movements (med ball)			
Abdominals	Choose 2 or 3 activities from abdominals (med ball)			
Speed and Agility				
Monday and Thursday		Tuesday and Friday		
<ul style="list-style-type: none"> ▪ Dynamic Warm up ▪ Chose 2-4 Acceleration drills ▪ Choose 2-4 Speed drills ▪ Chose 1-3 Plyometric drills (Perform each drill 3-5x)		<ul style="list-style-type: none"> ▪ Dynamic Warm up ▪ Chose between 5-10 agility drills ▪ Chose 1-2 activities from speed endurance or lactic acid training (Perform each drill 2-4x)		

Power Training

Monday and Thursday				
Exercise	Week 1	Week 2	Week 3	Week 4
Clean and press	5*5	4*5	3*5	2*5
Hang clean/snatch	3*5	3*5	3*5	2*5
Push press	2* 5-8	3* 5-8	3* 5-8	2* 5-8
Bench press	5*5-8	4*5-8	3*5-8	2*5-8
Push up plyo	2* max	3* max	3* max	2* max
Push ups or chest drops	3* 8-12	3* 8-12	3* 8-12	3* 8-12
Tuesday and Friday				
Squat or front squat	5* 5-8	4* 5-8	3* 5-8	2* 5-8
Jump squats	3* 5-8	4* 5-8	2* 5-8	3* 5-8
One leg plyo	2* 5-8	3* 5-8	3* 5-8	3* 5-8
Pulling Exercise	3* 5-8	2* 5-8	3* 5-8	3* 5-8
Pulling exercise	3* 5-8	2* 5-8	3* 5-8	3* 5-8
Trunk Med	Med ball training for abs			
Speed and Agility				
Monday and Thursday		Tuesday and Friday		
<ul style="list-style-type: none"> ▪ Dynamic Warm up (over speed training) ▪ Chose 3-4 Acceleration drills ▪ Choose 3-4 Speed drills (combination drills) 		<ul style="list-style-type: none"> ▪ Dynamic Warm up ▪ Chose between 5-10 agility drills ▪ Chose 3-4 Plyometric drills(Perform each drill 3-5x) 		

Exercise Selection

Explosive Movements	<ul style="list-style-type: none"> ▪ Snatch Drops ▪ High pulls
Pulling movements	<ul style="list-style-type: none"> ▪ Pull ups (various Grip) ▪ Bent Rows ▪ Cable pulley exercises
Pressing movements	<ul style="list-style-type: none"> ▪ Push ups ▪ Dumbbell ▪ Standing shoulder press ▪ Inverted shoulder press ▪ Swiss ball pressing exercises ▪ Cable pressing exercises
Lower body	<ul style="list-style-type: none"> ▪ Squats (barbell, dumbbell) ▪ Front squats (goal 80 % back squat) ▪ Over head squats ▪ Leg curls (normal, 2 up one down) ▪ Good Morning
	<ul style="list-style-type: none"> ▪ Dead lifts (no more than 20 % max clean) ▪ Pulls (no more than 10% max clean)
	<ul style="list-style-type: none"> ▪ One leg squat (elevated, assisted, non) ▪ Lunges (back ,front, Plea, overhead) ▪ Step ups ▪ One leg plyo
Accessory Movements (performed at the end of the Training Session)	<ul style="list-style-type: none"> ▪ Triceps Exercises ▪ Bicep exercise ▪ Calves
Stability	<ul style="list-style-type: none"> ▪ Scapular Retractions ▪ Hyper extension, Reverse Hyper-extension ▪ Abductor/ adductor (pulley or drag) ▪ Rotator cuff
Dynamic ROM exercises	<ul style="list-style-type: none"> ▪ Med ball swings (side, front, over shoulder) ▪ Medial rotation, External rotation
Grip Work	<ul style="list-style-type: none"> ▪ Increase diameter ▪ Forearm work
Reflex Drills (performed 2-4X per week)	<ul style="list-style-type: none"> ▪ Eyes closed- say open ▪ Two ball drop ▪ Back turn and catch ▪ Kneeling Swiss toss ▪ Over shoulder toss
Endurance Conditioning Drills (performed at the end the work out to improve toughness and lactate tolerance)	<ul style="list-style-type: none"> ▪ Prone bridge ▪ Wall squats ▪ Half pull-up ▪ Half push up

List of Speed and Agility Drills

Exercise	Specific Exercises and drills	Reps and sets
Dynamic warm up	A,B High knees Butt kicks Progressions Ankling, Arm swings Explosive knee drive	Make a 10-20 meter course and perform each warm up 2 X each (chose 2-3 activities before speed and agility sessions)
Acceleration	Lying Starts Falling Starts Hill sprints Progressions	Activities are performed 2-5 x each, depending on the training phase. (These activities are performed on day one and day three) For locomotion plyometrics use a 15-25 meter distance
Speed	Ins and Outs 20-40 yard fly Leaping Single leg high knee Double leg high knee Pawing Stationary fast leg	
Plyometrics Resisted Running	Jump squats Split squats Double leg tap Power skipping Speed skater One leg hops, One leg bound Two leg hop , 2 legged bound Side to side jumps Barrier jumps, slant board Resisted run Resist and let go	
Agility and Cone drills	Shuffle step Agility ladder (5min) Carioca, Tapioca Backpedal T-drill Sprawls with ball (5-10 reps) Kneeling Swiss ball toss 4 point crab shuffle Gorilla walk	Activity are performed between 2-5 x each, depending on the training phase (These activities are performed on day two and four.)
Speed Endurance	There and Back 300 meter Shuttle Lactic acid training	
Aerobic	1.5 mile run 20-40 min continuous running Other aerobic activities	Aerobic early in season, perform more speed endurance work as the season come closer

Acceleration, speed, speed endurance and Lactic acid training

Sample running	
Acceleration and speed (speed short (0-40m) Work/Rest Ratio 1:5	
Over speed 5*20 Flies 5*20 Ins and outs Uphill running	Short duration high intensity sports e.g. football
Over speed/ regular sprints 3(3 reps over speed/ 2 reps non assisted)	
Lying starts 5*10-20 4-point start resist and let go falling starts	
Flies 5*20 Stationary 5*20-40 Ins and outs 5* Leaps 5*20	
Speed and speed endurance training (speed med 40-80 speed long 80-120)	
Speed Work/Rest Ratio 1:5	Speed Endurance 1:5-1:3 Over 120m
5*40, 5*80, 5*120	Short duration high intensity sports Longer duration sports Position requiring repeated sustained workloads over 6 second in duration. E.g. Wide receivers, Hockey, soccer
5*50, 5*80, 3-5*200	
5*80, 5*150, 2-3*300	
5* 60 ins and outs, 5*100-150, 3*200, 1*400	
2(5*150-200) (SE) W:R 1:3	
Lactate training (close to vo2 max) Work/rest ratio 1:1	
800, 800, 400, 400, 200, 200 5*100 meter strides	Use for sport that are longer in duration e.g. soccer or with a high aerobic component
800, 400, 400, 800 400, 200, 200, 400	
200, 400, 600, 800 5*100 meter strides	
Aerobic conditioning- High aerobic component or during base	
Steady state	Slow long run 30-45 min
Tempo	20 -30 min or longer repetitive bouts e.g. 4*5-10 min (short duration field sports during base training

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