Reactive

The concentric phase of the triphasic training model is the sexy part of dynamic muscle action. It's the rock star that gets all the attention. You never walk into a gym and ask someone, "How much can you eccentrically lower to your chest?" You walk up and ask, "How much do you Bench?" You're asking how much weight they can concentrically lift by pushing it off their chest.

The concentric phase is the measuring stick used to evaluate all athletic performance. How much can you lift? How far can you jump? How fast can you run? These are all performance measures based on force output measured in the concentric phase. Specifically as it relates to dynamic movement, the concentric phase is the measure of an athlete's rate of force development (RFD).

In any dynamic movement, the combined force of the stretch reflex and stretch-shortening cycle aids the RFD. Recall from the earlier segments that the amount of potential energy stored within the musculoskeletal structure depends on the preceding eccentric and isometric contractions. When we understand how the concentric phase works in conjunction with these phases, we see why the concentric phase is imperative for maximizing explosive strength, RFD and performance. Would Nolan Ryan have been as intimidating without his fastball? Would Walter Payton have been as great if he couldn't cut? The answer: an emphatic "No!" An athlete who can quickly build and absorb energy is ineffective if he cannot use that energy concentrically to rapidly produce force.

The true importance of training the concentric phase is the synchronization of the entire triphasic muscle action—maximizing the energy transfer from the preceding eccentric and isometric phases into a unified, explosive and dynamic movement. For the purpose of simplicity, we are going to package these mechanisms into two categories—inhibition/disinhibition and synchronization.

Inhibition/Disinhibition

In every muscular action, there is an agonist and an antagonist, an inhibitor and a disinhibitor. For our purposes here, all you need to understand is that while the agonist is concentrically

contracting (shortening) to produce force, the antagonist is eccentrically contracting (lengthening). The purpose of the eccentric contraction is to try to decelerate the speed and force of the concentric contraction to protect the joints and ensure that the antagonist muscle doesn't tear from rapid stretching. Training the concentric phase to perform explosive dynamic movements improves intermuscular coordination, allowing for the inhibition of the antagonist muscle and resulting in maximal RFD. Put another way, by training the concentric phase, you're also training the inhibition of the antagonist.

Synchronization

There's no question that an athlete who can generate more explosive force in less time has a decisive advantage. However, the advantage only goes to athletes who can unleash that power in a manner that gives them a performance edge. Nolan Ryan could touch 100 mph on the radar gun consistently, but that's not what made him a Hall of Fame pitcher. The ability to place those 100 mph fastballs wherever the catcher put his glove is what made him Ryan the most feared pitcher of his era.

As an example, compare the Hang Clean to a Romanian Deadlift and Shrug. A novice athlete can quickly learn to perform a proper Romanian Deadlift and Shrug. It is a slow, controlled movement that allows time for the athlete's neuromuscular system to interpret, process and execute the movement. On the other hand, teaching the Hang Clean can be a long and arduous process, even though it’s similar to the RDL and Shrug. In the case of the Hang Clean, decreasing the weight and increasing the speed of the exercise overloads the athlete’s neuromuscular system.

The point is that like the eccentric and isometric phases of a dynamic movement, the concentric phase is a learned and trainable skill. An athlete can learn to concentrically perform a Back Squat in a few minutes. It's intuitive since it’s a neuromuscular action that is performed on a daily basis. However, teaching an athlete to move a bar like a shot out of a cannon takes time and a great deal of concentric-focused training.

How to Apply Concentric Training

This is fairly simple and straightforward—train fast! Concentric training will look very familiar to most, because it's the predominant form of stress used in training. However, it only looks similar on paper. An athlete training concentrically after first building a solid foundation of eccentric and isometric strength will be able to move loads at much higher velocities.

TABLE 3.10: CONCENTRIC LOADING PARAMETERS AND THEIR RESPECTIVE MESOCYCLE

LOAD	TOTAL TIME OF CONCENTRIC	REP RANGE	SETS	MESOCYCLE
97.5%	REACTIVE	1	1–2	ABOVE 80%
95%	REACTIVE	1	2–3	
90%	REACTIVE	1–2	3–4	
85%	REACTIVE	1–2	3–4	
80%	REACTIVE	1–3	4–5	
75%	REACTIVE	1–3	4–5	55–80%
70%	REACTIVE	2–3	4–6	
65%	REACTIVE	3	4–6	
60%	REACTIVE	3	4–6	
55%	REACTIVE	3	4–6	BELOW 55%
50%	REACTIVE	3	4–6	
45%	REACTIVE	3	4–6	
40%	REACTIVE	4	4–6	
35%	REACTIVE	4	4–6	
30%	REACTIVE	4	4–6	

TABLE 3.11: EXAMPLE EXERCISES WITH REACTIVE CONCENTRIC MEANS	
EXERCISE	**COACHING POINTS**
BACK SQUAT - REACTIVE	1. Set up with the bar on the back of the shoulders. 2. Keeping the chest up and the back flat, pull yourself down into the bottom of the squat. 3. Once in the bottom, explosively fire out as fast as possible. 4. Repeat for the desired number of repetitions.
SINGLE LEG DB FRONT SQUAT - REACTIVE	1. Holding a pair of dumbbells on the shoulders, keep the chest up and the back flat. 2. One leg should be elevated to the rear. 3. Using the front leg, pull rapidly into the bottom of the squat. 4. Once in the bottom, explosively fire out and repeat for the desired repetitions.
RDL - REACTIVE	1. Grab the bar just outside of the thighs with the feet shoulder width apart. 2. Keeping the chest up and the back flat, lower the bar along the thighs rapidly. 3. Once the bar hits the bottom position, explosively fire up and return to the start. 4. Repeat for the prescribed repetitions.
BENCH PRESS - REACTIVE	1. While laying on your back, grab the bar one thumb length away from the knurling. 2. Using the upper back, pull the bar rapidly into the chest. 3. Once the bar touches the chest, explosively throw it as hard as possible. 4. Repeat for the prescribed repetitions.

TABLE 4.5: Progressive Loading Scheme			
Week	Monday Loading (Medium Intensity)	Wednesday Loading (High Intensity)	Friday Loading (Low Intensity)
1	82.5% 1–2 Reps, 4–5 sets	87.5% 1 Rep, 3–4 sets	75% 4–5 Reps, 4–5 sets
2	85% 1–2 Reps, 4–5 sets	90% 1 Rep, 3–4 sets	77.5% 3–5 Reps, 4–5 sets
3	87.5% 1–2 Reps, 4–5 sets	92.5% 1 Rep, 3–4 sets	80% 3–4 Reps, 4–5 sets

TABLE 4.9: Monday Triphasic Loading Parameters					
Block	Intensity	Load	Tempo	Reps	Sets
Block 1 (Eccentric)	Medium Intensity	82–87%	6:0:0:0	1–3	2–4
Block 2 (Isometric)		82–87%	0:3:0:0	1–3	3–5
Block 3 (Concentric)		82–87%	0:0:0:0	2–4	3–4

TABLE 4.8: MONDAY LOADING (MEDIUM INTENSITY)

% 1RM	Maximum Reps Possible	High Quality Reps (strength)	Sets (off-season)	Sets (in-season)
97.5%	1–2			
95 %	2			
92.5%	2–3			
90%	3–4			
87.5%	4	1	3–4	2–3
85%	4–5	1–2	4–5	2–3
82.5%	5	1–2	4–5	2–3
80%	5–6			
77.5%	6–7			
75%	7 - 8			

TABLE 4.11: WEDNESDAY LOADING (HIGH INTENSITY)

% 1RM	Maximum Reps Possible	High Quality Reps (strength)	Sets (off-season)	Sets (in-season)
97.5%	1–2	1	1–2	1–2
95 %	2	1	2–3	1–2
92.5%	2–3	1	3–4	1–2
90%	3–4	1	3–4	2–3
87.5%	4			
85%	4–5			
82.5%	5			
80%	5–6			
77.5%	6–7			
75%	7–8			

TABLE 4.12: WEDNESDAY TRIPHASIC LOADING PARAMETERS

BLOCK	INTENSITY	LOAD	TEMPO	REPS	SETS
BLOCK 1 (ECCENTRIC)	HIGH INTENSITY	90–97%	REACTIVE 0:0:0:0	1	1–4
BLOCK 2 (ISOMETRIC)		90–97%	REACTIVE 0:0:0:0	1	1–4
BLOCK 3 (CONCENTRIC)		90–97%	REACTIVE 0:0:0:0	1	1–4

TABLE 4.13: FRIDAY LOADING (LOW INTENSITY)

% 1RM	MAXIMUM REPS POSSIBLE	HIGH QUALITY REPS (VOLUME)	SETS (OFF-SEASON)	SETS (IN-SEASON)
95 %	2			
92.5%	2–3			
90%	3–4			
87.5%	4			
85%	4–5			
82.5%	5			
80%	5–6	3–4	4–5	IN-SEASON VOLUME COMES FROM PRACTICE
77.5%	6–7	3–4	4–5	
75%	7–8	4–5	4–5	

TABLE 4.19: ABOVE 80 PERCENT THREE-DAY VERSUS FOUR-DAY MODEL

TRAINING WEEK:		DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6
THREE-DAY MODEL	FOCUS	TOTAL BODY	OFF	TOTAL BODY	OFF	TOTAL BODY	OFF
	LOAD	82–87%		90–97%		75–80%	
	MEANS APPLIED	TRIPHASIC		DYNAMIC		TRIPHASIC	
FOUR-DAY MODEL	FOCUS	LOWER BODY	UPPER BODY	OFF	LOWER BODY	UPPER BODY	OFF
	LOAD	82–87%	82–87%		90–97%	90–97%	
	MEANS APPLIED	TRIPHASIC			DYNAMIC		

TABLE 4.21: ABOVE 80 PERCENT THREE-DAY VERSUS FIVE-DAY MODEL

TRAINING WEEK:		DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6
THREE-DAY MODEL	FOCUS	TOTAL BODY	OFF	TOTAL BODY	OFF	TOTAL BODY	OFF
	LOAD	82–87%		90–97%		75–80%	
	MEANS APPLIED	TRIPHASIC		DYNAMIC		TRIPHASIC	
FIVE-DAY MODEL	FOCUS	LOWER BODY	UPPER BODY	LOWER BODY	UPPER BODY	TOTAL BODY	OFF
	LOAD	82–87%	82–87%	90–97%	90–97%	75–80%	
	MEANS APPLIED	TRIPHASIC		DYNAMIC		TRIPHASIC	

TABLE 4.23: Above 80 Percent Three-Day Versus Six-Day Model

Training Week:		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
Three-Day Model	Focus	Total Body	Off	Total Body	Off	Total Body	Off
	Load	82–87%		90–97%		75–80%	
	Means Applied	Triphasic		Dynamic		Triphasic	
Six-Day Model	Focus	Lower Body	Upper Body	Lower Body	Upper Body	Lower Body	Upper Body
	Load	82–87%	82–87%	90–97%	90–97%	75–80%	75–80%
	Means Applied	Triphasic		Dynamic		Triphasic	

TABLE 4.2

		MONDAY LOADING (MEDIUM INTENSITY)			WEDNESDAY LOADING (HIGH INTENSITY)			FRIDAY LOADING (HIGH VOLUME)		
% 1-RM	MAXIMUM REPS POSSIBLE	HIGH QUALITY REPS (STRENGTH)	SETS (OFF-SEASON)	SETS (IN-SEASON)	HIGH QUALITY REPS (STRENGTH)	SETS (OFF-SEASON)	SETS (IN-SEASON)	HIGH QUALITY REPS (VOLUME)	SETS (OFF-SEASON)	SETS (IN-SEASON)
97.5%	1 - 2				1	1 - 2	1 - 2			
95 %	2				1	2 - 3	1 - 2			
92.5%	2 - 3				1	3 - 4	1 - 2			
90%	3 - 4				1	3 - 4	2 - 3			
87.50%	4	1	3 - 4	2 - 3						
85%	4 - 5	1 - 2	4 - 5	2 - 3						
82.5%	5	1 - 2	4 - 5	2 - 3						
80%	5 - 6							3 - 4	4 - 5	IN-SEASON VOLUME COMES FROM PRACTICE
77.5%	6 - 7							3 - 4	4 - 5	
75%	7 - 8							4 - 5	4 - 5	

This table displays my three-day loading variables of the above 80 percent undulated mesocycle. The column on the far left displays the percentage load of the athlete's 1RM with the maximal number of repetitions possible listed in the column to the right. The reps and sets within each training day indicate the number of both that can be performed while maintaining the quality of work at a high level for the athlete. A couple things to notice—the rep ranges stay the same regardless of whether the athlete is in in-season or off-season training and the number of sets used for in-season training are fewer than off-season training. This is due to the high work demands and the added stress of practice and games during the season. Also, look at Friday, Sets (in-season). During the season, all the volume work comes from practice and games. Don't train volume in-season! You'll overtrain your athletes.

An Exmple of a 5 day Conditioning protocol that can be used, however if conditioning 5 days, don't use the whole workouts provided below.

TRAINING DAY	CONDITIOING GOAL	SPECIAL INSTRUCTIONS	EXAMPLE OF WORKOUTS
DAY 1	**Short Sprints** (High Quality Speed)	Sprints under 10 seconds Full recovery: rest 90-120 seconds	Alactic High Quality Workout Flying 60s 16 week short sprint workouts Cone agility
DAY 2	**Long Sprints or Short Sprints w/ Reduced Rest** (Speed Conditioning)	Sprints over 15 seconds Or Sprints under 10 recovery under 20 seconds	 High Quality Lactic Anaerobic Power Training Builder Metabolic Injury Prevention Runs
DAY 3	**Short Sprints** (High Quality Speed)	Sprints under 10 seconds Full recovery: rest 90-120 seconds	Alactic High Quality Workout Flying 60s 16 week short sprint workouts Cone agility
DAY 4	**Short Sprints** (Anaerobic Conditioning)	Sprints under 10 seconds Limit recovery: 45-60 seconds	Work Capacity Alactic Anaerobic Training Builder Flying 60s 16 week short sprint workouts Cone agility
DAY 5	**Longer Sprints or Continuous Running** (Oxidative Conditioning)	This day is purely work capacity	Aerobic Work Capacity Training Builder Metabolic Injury Prevention Runs Bike Conditioning TrashBall

TABLE 4.1: EXAMPLE QUALITY REPS OVER QUANTITY							
PARAMETERS:	SET 1	SET 2	SET 3	SET 4	SET 5	TOTAL REPS	NUMBER OF QUALITY REPS
3X5 AT 80%	5 REPS	5 REPS	5 REPS			15	4–5
5X3 AT 80%	3 REPS	3 REPS	3 REPS	3 REPS	3 REPS	15	13–14

Basic Undulated Method of Yearly Training

Month of Training	**Month 1**	**Month 2**			**Month 3**			**Month 4**			**Month 5**		
Focus of Loading	Work Capacity	Below 80% of Max lift			Above 80% of Max lift			Below 80% of Max lift			Between 50% - 25% of Max lift		
Weekly loading within month	High Volume Low Weight	**Day 1 65%**	**Day 2 80 %**	**Day 3 55 %**	**Day 1 85 %**	**Day 2 92 %**	**Day 3 80 %**	**Day 1 65 %**	**Day 2 80 %**	**Day 3 55 %**	**Day 1 40 %**	**Day 2 50 %**	**Day 3 25 %**
Duration of Month	3 to 6 Weeks	3 to 4 Weeks			3 to 4 Weeks			3 to 4 Weeks			3 to 4 Weeks		
Focus	**Get in Shape**	**Speed Strength**			**Strength**			**Speed Strength**			**High Velocity Peaking for Sport**		

Above 80 Progressive loading for Strength	Loading Day 1 Sub Max Effort Day	Loading Day 2 Max Strength Day	Loading Day 3 Higher Volume Day
Week 4	85% 1-2 Reps, 4-5 sets	92.5% 1 Rep, 3-4 sets	80% 3-4 Reps, 4-5 sets
Week 3	82.5% 1-2 Reps, 4-5 sets	90% 1 Rep, 3-4 sets	77.5% 3-5 Reps, 4-5 sets
Week 2	80% 1-2 Reps, 4-5 sets	87.5%1 Rep, 3-4 sets	75% 4-5 Reps, 4-5 sets
Week 1	77.5% 1-3 Reps, 4-5 sets	85% 1-2 Reps, 4-5 sets	72.5% 4-5 Reps, 4-5 sets

The Follow Graph is a basic overview of a loading model use for various time and training focus.

Weekly Rep Schemes in Undulated model	Day 1 of the Week	Day 2 of the Week	Day 3 of the week
Strength Method - Above 80 Percent of Percent of Max Lift	2 -3 Reps per Set – Load used is 82.5%-87.5% of Max lift	1 Rep Per Set - Load used is 90%-97.5% of Max lift	3-5 Reps Per Set - Load used is 75%-80% of Max lift
Speed Strength – load is Between 55%-80%	3-4 Reps Per Set – Load used is 65%-72.5% of Max lift	1-2 Reps Per Sets – Load used is 80%-75% of Max lift	3-6 Reps Per Sets – Load used is 55%-65% of Max lift
High Velocity Peaking Method	5-8 Rep Per Set – Load used is 40% of Max lift	4-6 Rep Per Set – Load used is 50% of Max lift	6-8 Rep Per Set – Load used is 25% of Max lift
Other Methods used on Shifted Undulated model			
Bodybuilding Method	8-10 Reps Per Set - Load used is 77%-70% of Max lift	6 -8 Reps Per Set - Load used is 80% - 75% of Max lift	10-12 Reps Per Set Load used is 70% - 60% of Max lift
Strength Speed Method - Load Between 65– 90 percent of Max Lift	3-5 Reps Per Set – Load used is 72.5%-77.5% of Max lift	1-3 Reps Per Set - Load used is 85%-90% of Max lift	4-5 Reps Per Set - Load used is 65%-70% of Max lift