Auto-Regulatory Training Methods for Sports Performance Development

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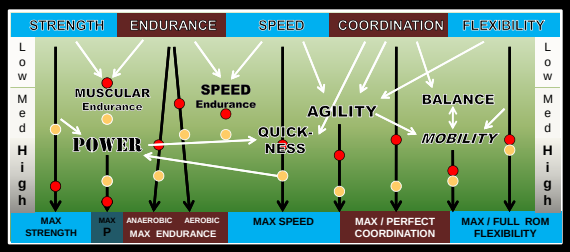
Dynamic Effort Leg Day

Key Points To Cover

1. Biomotor Ability Needs
2. Indiviual Differences
3. Auto-regulatory basics
4. Auto-regulatory Research
5. The nervous system
6. Sample workouts and how to incorporate them into AREG training

Biomotor Abilities
- what are the athlete's needs?



= Football OL = Basketball G

Strength is Individual

Everyone's Not A Big Dog.

Everyone Can Become Stronger and Develop Athleticism.

Maximize Their Genetic Potential

Auto-Regulatory Resources

This book teaches you the backbone of **Dietrich Buchenholz**' revolutionary Inno-Sport training system

Everything you need to know about NeuroDynamics and AutoRegulatory Training are covered in this book!

Neuro-Dynamics

PROGRAM INGREDIENTS

You need to implement several methods of training to optimally develop sports performance.


Power Lifting
Neuro-Duration


Body-building
Neuro-Duration


Olympic Weight Lifting
Neuro-Magnitude


Speed & Agility
Neuro-Rate & Magnitude


Plyometrics
Neuro-Rate & Magnitude

Neuro-dynamics

- There are 3 general classifications of work or modalities contrived from the electrical influence that internal or external means have on recruiting motor units. The way that tension is activated and sustained and to the degree of involvement are all part of the reasoning for these descriptions.

Neuro-rate(speed)

- This is movement associated with the quickest neural rate and transmission. Examples of neuro-rate movements are tapping the hands and feet as fast as possible, cycling the legs, and other movements that require speed above all else.

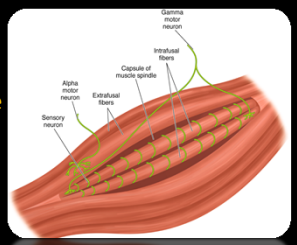
Neuro-Magnitude (level)

- This is movement that is associated with the greatest electrical activity, tension recruitment, and force manipulated (motor unit recruitment) - Examples of neuro-magnitude dominant events are activities associated with the greatest power displayed with great acceleration.
- Reactive activities fit well into this modality and they include exercises such as bench press throws and catches, depth jumps, jump squats, etc. Neuro-magnitude dominant activities show the highest level of absolute neural output.

What's Trainable

- for total athletic development?

- Elastic Energy - Stretch Shortening Cycle
- A quick forceful eccentric/stretch will be followed by a quick forceful concentric.
  - Finger example
    - Voluntary contraction
    - SSC contraction
    - Combined contraction
    - Negative tension Combined contraction



Muscle spindle – myotatic stretch reflex

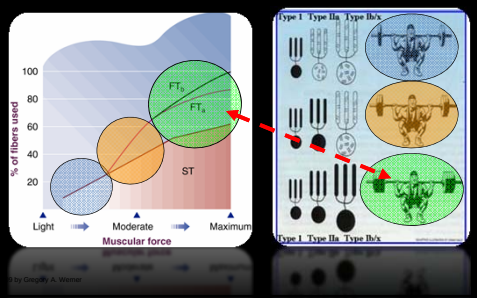
Neuro-Duration(length of neural output or strength)

- This is movement that is associated with the length of the electrical activity. The ability to struggle against a heavy load or display strength is an example of neuro-duration work.
- Called Heavy Training or Max Effort Training.

Max Effort Rationale

- the size principle

- Used to recruit high threshold Fast Twitch Motor Units (FT fibers)



Neuro-Dynamic Combinations

- Speed as in a sprint is comprised of both neuro-magnitude and neuro-rate capacities. Neuro-magnitude would be the level of force you put into the ground with each stride (magnitude of force). Neuro-rate would be the speed at which your limbs move (stride rate). Keep in mind in this situation that neuro-magnitude also relies on neuro-duration capacity.
- Strength is a combination of neuro-magnitude and neuro-duration functions. Magnitude would be the ability to apply a maximal level of electrical energy against the load, where duration would be the length of time you can apply that energy.

Dynamic Effort Rationale

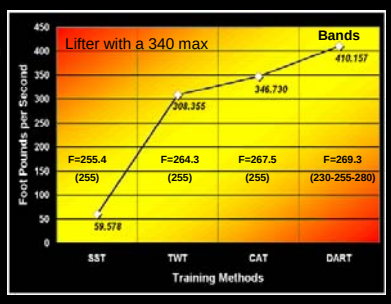
Power Output Graph {ft.lbs/sec} lifting a 75% load

SST= super slow training, 255, 5-0-5

TWT= trad. weight training, 255, 2-0-1

CAT= compensatory acceleration training, 255, 2-0-X

DART= Dynamic Accentuated Resistance Training, 230-255-280, 2-0-X



Mike Berry, Power-Up USA, Inc., (www.strengthcats.com

Auto-regulatory(AREG) basics

- Auto-regulatory(AREG) refers to a system that:
  - Manages intensity and/or volume in order to regulate individual daily differences in capacity
  - Allows individual differences to be self governed and applied.
  - Lets daily performance be your guide.

Your absolute ability will fluctuate ***daily*** and so will your work capacity. The real benefit of Auto-regulatory training is it allows you to recognize and take advantage of these normal fluctuations.

Dietrich Buchenholz'

Auto-regulatory(AREG) basics

- The easiest aspect of AREG training to comprehend is that the amount of time or rest that you take between training sessions is commensurate with the level of fatigue that you induce with a training session.
- If nothing else, you should pay attention to the importance of managing fatigue rather than simply creating fatigue.
- The level of super-compensation, or progress, that you make from your training is commensurate with the degree of fatigue induced. If you can match the correct amount of fatigue inducement from your training with the frequency of your training, superior progress is a result.

Auto-regulatory(AREG) basics

- If aspects of your training like fatigue, frequency, and recovery are matched correctly then the amount of fatigue you induce in a session will reciprocate into about an equal amount of super-compensation the next session.
  - a fatigue inducement of say 6%, or a 6% drop off in performance should consistently yield up a 6% increase by the next session if everything is adhered to properly.
  - Although this won't always occur, it should occur often enough. Progress should always be evident and anything less than a 1.5% gain between sessions is unacceptable and means something is amiss in fatigue, frequency, recovery, or programming.

Auto-regulatory(AREG) basics

- You can account for fatigue by measuring reps, load, time, height, and paying attention to your performance.
- Progress can be measured as either an increase in absolute ability for a specific task, or an increase in work capacity.

Auto-regulatory(AREG) basics

- The degree to which compensation raises above the initial level between sessions (progress) is directly proportional to the degree which fatigue is administered in the previous session. The goal is to manage, calculate, and take advantage of the body's super-compensation cycle, mainly paying attention to the nervous system.

The Effect of Autoregulatory Progressive Resistance Exercise vs. Linear Periodization on Strength Improvement in College Athletes.

Table 1 . Subject characteristics.*+++

	APRE group ($n = 12$)	LP group ($n = 11$)
Age (y)	20.2 ± 1.0	20.3 ± 1.6
Training age (y)	2.9 ± 0.7	2.43 ± 0.7
Body mass (kg)	111.3 ± 21.9	104.1 ± 22.5
Height (m)	1.85 ± 0.7	1.87 ± 0.3

*APRE = autoregulatory progressive resistance exercise; LP = linear periodization.
†Values are presented as mean ± *SD*.
‡No significant differences were found between the APRE and LP groups.

The Effect of Autoregulatory Progressive Resistance Exercise vs. Linear Periodization on Strength Improvement in College Athletes.
Mann, J; Thyfault, John; Ivey, Pat; Sayers, Stephen, Journal of Strength & Conditioning Research. 24(7):1718-1723, July 2010.

The Effect of Autoregulatory Progressive Resistance Exercise vs. Linear Periodization on Strength Improvement in College Athletes.

Table 2 . APRE protocol for 6RM and set 4 adjustment.

Repetitions	Intensity (% of 6RM)
APRE protocol for 6RM	
10×	50%
6×	75%
Maximum	6RM
Maximum	Adjusted weight
Repetitions for set 3	Set 4 adjustment (lb)
6RM routine adjustment	
0–2	−5 to −10
3–4	0 to −5
5–7	No change
8–12	+5 to +10
>13	+10 to +15

*APRE = autoregulatory progressive resistance exercise; LP = linear periodization; 6RM = 6 repetitions maximum.

Autoregulatory P.R.E. Adjustments

3RM Protocol	6RM Protocol	10RM Protocol
50% of 3RM – 6 reps	50% of 6RM – 10 reps	50% of 10RM – 12 reps
75% of 3RM – 3 reps	75% of 6RM – 6 reps	75% of 10RM – 10 reps
Reps to failure with 3RM	Reps to failure with 6RM	Reps to failure with 10RM
Adjusted reps to failure	Adjusted reps to failure	Adjusted reps to failure

Reps in third set (6RM protocol)	Adjustment for fourth set (kg)
0-2	-2.5 to -5
3-4	0 to -2.5
5-7	No change
8-12	+2.5 to +5
> 13	+5 to +7.5

The Effect of Autoregulatory Progressive Resistance Exercise vs. Linear Periodization on Strength Improvement in College Athletes.

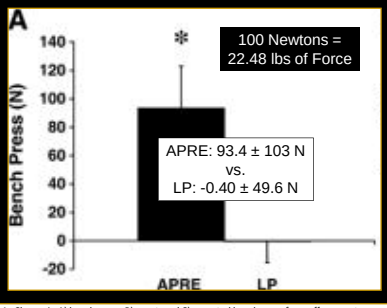


Figure 1 . Change in A) bench press, B) squat, and C) repeated bench press from off-season to preseason for autoregulating progressive resistance exercise (APRE) and linear periodization (LP) groups. All data are presented as mean +/- SEM. *Significant differences between APRE and LP at the p <= 0.05 level.

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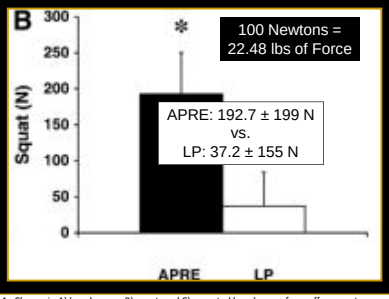

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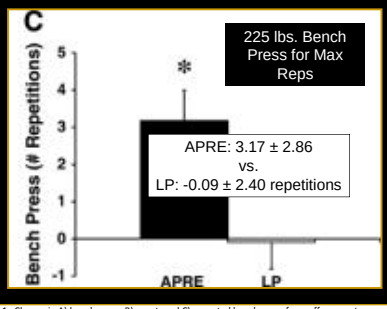

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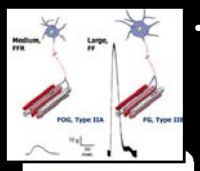
The Nervous System

- ***The nervous system controls every cell, tissue, and organ in the human body***.
- Movement can be classified into several modes but the nervous system is the common thread of movement production and movement reaction.
- Neuro-dynamics is the dictation of this control center.

Study this structure. Function?

Fast Twitch



- By doing the proper lifts, jumps and sprints ***in a game-like metabolic state*** you will increase the sport specific horsepower of your engine – **your fast twitch motor units.**

Put A Bigger Engine In Your Car.

Recovery Is Our Biggest Hurdle

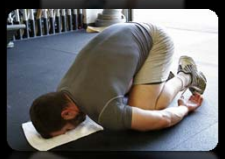
- If progress is not made during a session then something is amiss in fatigue management, recovery, or training prescription. Progress should be consistent.
- Usually lack of progress is caused by too much fatigue and not enough recovery but can be due to any number of factors.

Rule of thirds

- It will take you an average of 1/3 the amount of the drop off from the last training session in days to repeat that performance again - And another 1/3 in days to super-compensate and progress above that performance.
  - 6% drop-off or level of fatigue is induced in a session
  - it will take you 2 days to repeat that performance (1/3 of 6%=2 days), and another 2 days to rise above that performance (2/3 of 6%=4 days).

"Staleness" and Overtraining

- Unexplained and persistent poor performance
- Moodiness, fatigue, depression, and irritability
- Painful muscles
- Insomnia
- ↑ heart rate
- Weight loss
- ↑ susceptibility to overuse injuries, colds an GI problems



Bench Press 5,5,Max,Max,Max

		5x	5x	Max	Max	Max
1.	Rachel	85	115	130x9		
2.	Kiara	95	125	135x7		
3.	Kanita	95	125	145x7		
4.	Lauren	95	125	145x7		
5.	Nikki	95	125	140x15		
6.	Tarik	95	135	145x8		
7.	Jas	95	135	145x8		
8.	Debbie	85	115	125x12		
9.	Kirby	95	115	135x16		
10.	Jazmon	75	85	105x9		
11.	Toia	75	95	115x12		
12.	Crystal	65	70	75x7		
13.	Briana	75	95	105x12		

If you get <5 reps then decrease by 10 lbs.

5-6 reps then stay the same.

7+ reps then increase by 5 lbs.

V Lat Pulldown

4x6

85-125

75-105

Bench Press 5,5,Max,Max,Max

		5x	5x	Max	Max	Max
1.	Rachel	85	115	130x9	135x9	
2.	Kiara	95	125	135x7	140x8	
3.	Kanita	95	125	145x7	150x5	
4.	Lauren	95	125	145x7	150x6	
5.	Nikki	95	125	140x15	150x11	
6.	Tarik	95	135	145x8	155x6	
7.	Jas	95	135	145x8	155x6	
8.	Debbie	85	115	125x12	135x7	
9.	Kirby	95	115	135x16	145x11	
10.	Jazmon	75	85	105x9	110x6	
11.	Toia	75	95	115x12	125x7	
12.	Crystal	65	70	75x7	80x4	
13.	Briana	75	95	105x12	115x6	

If you get <5 reps then decrease by 10 lbs.

5-6 reps then stay the same.

7+ reps then increase by 5 lbs.

V Lat Pulldown
4x6
85-125
75-105

Rack Bench Press 5,5,Max,Max,Max

		5x	5x	Max	Max	Max
1.	Rachel	85	115	130x9	135x9	140x
2.	Kiara	95	125	135x7	140x8	145x
3.	Kanita	95	125	145x7	150x5	150x
4.	Lauren	95	125	145x7	150x6	150x
5.	Nikki	95	125	140x15	150x11	155x
6.	Tarik	95	135	145x8	155x6	155x
7.	Jas	95	135	145x8	155x6	155x
8.	Debbie	85	115	125x12	135x7	140
9.	Kirby	95	115	135x16	145x11	150
10.	Jazmon	75	85	105x9	110x6	110
11.	Toia	75	95	115x12	125x7	130x
12.	Crystal	65	70	75x7	80x4	70x7
13.	Briana	75	95	105x12	115x6	115x

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5.	Nikki	95	125	140x15	150x11	155x9
6.	Tarik	95	135	155x8	155x6	155x6
7.	Jas	95	135	145x8	155x6	155x6
8.	Debbie	85	115	125x12	135x7	140x5
9.	Kirby	95	115	135x16	145x11	150x10
10.	Jazmon	75	85	105x9	110x6	110x5
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13.	Briana	75	95	105x12	115x6	115x5

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V Lat Pulldown
4x6
85-125
75-105

Thank You

- Please contact me for more information.
- Greg Werner e-mail wernerga@jmu.edu
- Website https:/orgs.jmu.edu/strength
- Or www.jmusports.com

- The nervous system is the most important factor in performance and not the muscular system. At the structural level, a group of slow twitch fibers will transform to fast twitch fibers if the electrical impulse that activates them is of fast twitch character. One should start from the inside out and manipulate the speed(rate), level(magnitude), and duration(length) of these neural signals that initiate and relax movement to produce the desired performance.

- The nervous system is what is responsible for sport carryover. Local adaptive changes (changes in muscle size etc.) have been found far inferior to central, dominating characteristic changes of the internal system. An example of this is a small woman lifting a car off of her child in a life or death situation. Once the system can manage and displace the desired input from the center (nervous system) then it is the appropriate time to address local contractile systems as they carry out what the nervous system tells them. Muscle fiber type can change if the neural impulse changes so the transformation theory holds true if the demand to do so is appropriate, which validates the idea of working from the inside out rather than the outside in.

- A 6% drop-off in performance in a training session should yield a 6% elevation in performance the next session of the same type and same motor units if the fatigue is administered properly and recovery is proper. This won't always happen to such a large extent, but following the bodies natural rhythms it should happen often enough. This makes it possible for extremely rapid progress.

- Only 30% of the concentration of a coach should be on training and how to administer fatigue. The majority should be spent on raising performance.

- Psychological output must increase 6.5% to yield a 1% increase in performance
- The nervous system takes 2-3 times as long to super-compensate than the muscular system.
- Drop offs, cycles, and training frequency and their relationships are based on neural and psychological super-compensation. Little attention is paid to muscular soreness.

- Energetical elements (the structural fibers etc.) won't recover from a working set of considerable magnitude for up to 12 hrs later, explaining loss of strength per consecutive set.
- There are 24 weeks in every year that an athlete will have a slight increase in recovery ability and this value fluctuates on average once every 2 weeks.

- On 6 occassions average during the year there will be a sharp rise in recovery ability, typically every 2nd month.
- Training must include variance every 2 weeks with a brief but sharp rise in volume every 2 months.
- An athlete needs to modify 1 to multiple tactics of his training program every 2 weeks. He also needs to make adjustments to 1 or more of his restoration methods during the same time.

Training Methods

- The three methods for developing force and overloading the fast motor units are (Vladimir M. Zatsiorsky):
- **Max Effort – Maximum Strength** (Strong/Heavy reps
  - 85-100% 1RM (Heavy)
- **Dynamic Effort – Explosive Strength** (*Speed reps*)
  - Submax Load at Max Speed (Explosive)
  - *Plyometrics – SSC activities, reactive/reflexive*
  - Overload/Resisted and Overspeed/Assisted Sprints
  - Speed, Agility and Footwork Drills
- **Repetitive Effort – Strength Endurance** (Burn reps)
  - Submax loads almost to failure (Fatigue)
  - Lactate tolerance training
  - Work capacity circuits: BlitzFit, Tabata, Brazilian, Fartleks, Cross Fit, 300's