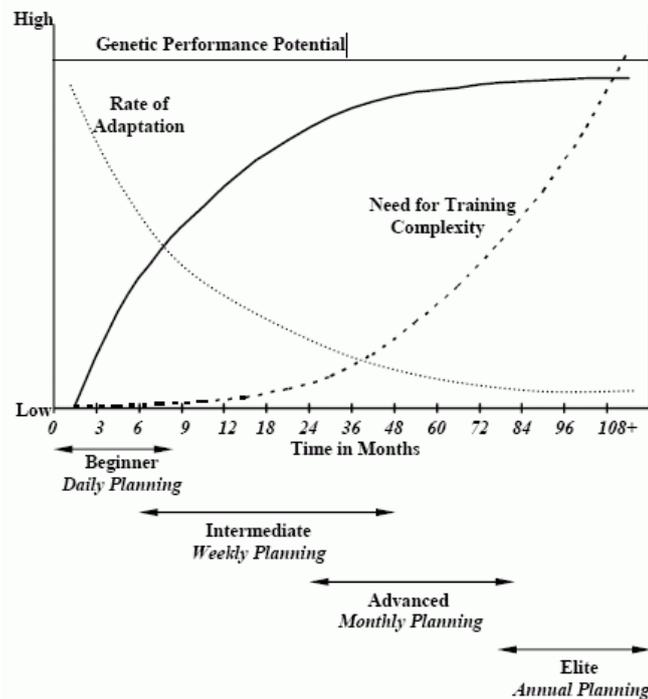# Planning the strength training
From novice to elite

CHARACTERISTICS OF THE LIFTER

According to Mark Rippetoe, the author of Practical Programming book, the lifters can be generaly classified to four groups according to their level: novice, intermediate, advanced and elite. When planning strength training, one should take into account the level of the lifter, because there are distinct characteristic within each group. The planning of strength training for each group will be considered at the end of this article.

Taken from Rippetoe, Mark (2007). *Practical Programming.* Aasgaard Company

STRENGTH TRAINING GOALS

Depending on the author, there can be numerous goals pursued with strength training. I tried to review them in my last article entitled *Concurrent strategies in strength training*.

It can be said that reaching of the different strength training goals (and thus motor qualities) is based on utilization of different loading protocols (weight, reps, sets, tempo, rest, etc.) or *methods*. So, each of the methods aimed at reaching different strength training goal utilize different loading protocols. This is based on the *repetition continuum*, or the 'idea' that different goals can be achieved utilizing different reps per set. There is a dynamic interaction between the variables of reps, sets and loads. The load used (% of 1RM) ultimately determines how many reps per set are done. Reps per set (or set time) ultimately determines how many total sets must be done. The interaction between the three will affect what adaptation is seen. Although not all authorities agree, there is thought to be a continuum of adaptations which may occur with different repetition sets. This continuum is called *repetition continuum*.

Without going into unnecesary theoretical discussion, I will use the following classification of strength training goals:

1. **Maximal and Relative Strength**
   - The goal is the development of maximal strength
   - The method used for developing this motor quality is **Maximal Effort**, or **ME**

2. **Explosive Strength**
   - The goal is the development of explosive strength, or the ability to produce great force in least amount of time (RFD – Rate of Force Development)
   - The method used for developing this motor quality is **Dynamic Effort**, or **DE**
   - Futher classification can include the development of explosive strength and reactive/elastic strength (plyometrics), although this is not that important for this discussion

3. **Muscular Hypertrophy**
   - The goal is the development of muscular hypertrophy, without going into the debate of *sarcoplasmatic* vs. *myofibrilar hypertrophy*
   - The method used for developing this motor quality is **Submaximal Effort**, or **SE** (mostly for *functional* or *myofibrilar hypertrophy*) and **Repetition Effort**, or **RE** (mostly for *total* or *sarcoplasmatic hypertrophy*).

4. **Muscular Endurance**
   - The goal is the development of muscular endurance, fat loss, *anatomic adaptation* and sarcoplasmatic hypertrophy (depending on the context). Some also put 'vascularization', 'glycogen depletion', 'mitochondria development' as the goal of this method
   - The method used for developing this motor quality is **Repetition Effort**, or **RE**

WHAT THE HECK IS THE PERIODIZATION ANYWAY?

Well, I guess there is no concise answer to this question. A lot of people define periodization differently, taking into account different parts of planning process. So, I am not so brave to give my own definition of what periodization really is. Anyway, when discussing periodization we must differ between, as I love to call them that way, *Three Zoom Levels*.

First Zoom Level
   - The planning of LTAD (long term athlete development), Olympic-year and annual training plan. This includes determination of preparatory phases, competition phases, transition phases and their structures depending on the competition schedule, age and level, along with the sport/position of the athlete. This also includes factors like wheather/climatics, training facilities aviable, competition schedule, number of peaks and the duration of those peaks athletes must achieve, etc, etc. One may add the determination of training components (goals) or motor abilities that needs to be adressed to achieve increase in performance

Second Zoom Level
   - Planning of the development of multiple training goals (motor abilities & skills) within each period defined by First Zoom Level. Here we can differ between **traditional approach** (concurrent or complex-parallel), **block** and **emphasis/pendulum** approach IMHO. The choice is dependent on the First Zoom Level (which defines how much time do we have, conditions, etc), number of training goals that must be developed and when, and their compatibility, the level of the athlete, etc.

Third Zoom Level
   - Progression and programming of development of each training goal (motor-ability). Basically this determines how loading protocols should be organized and how much: means (general/specific/competition), methods, loads (intensity, frequency, volume, recovery, etc). This includes the approach that uses delayed training effect via acute over-reaching too. This should be based on the previous Zoom Levels, athletes level, his work capacity (ability to sustain training loading and recover from it), supplementation, injury toleration and the optimal loading for each training goal.

It may sound funny that I have picked the term *Zoom Level*, but if you have ever used microscope or more possibly [Google Earth](), you know what I mean. The word Zoom can be easily substituted with the word *Planning*, and *voila*, the meaning is instantly evident.

Basically, the numerous factors determine Periodization (whatever that may acutally be anyway) used. There is no good or bad, just optimally picked based on those factors involved (context), goals and athletes.

When disecting and analysing training systems and discussing periodization and planning we must use differ between Zoom Levels. Different authors stick to one Zoom Level without considering other levels of the zoom. When the the periodization is mentioned, most of the authors talk about preparatory, competition and transition periods (First Zoom Level). Some of them talk about load progression, like 3+1 (3 weeks loading, 1 week unloading), waves and undulations and stuff (Third Zoom Level). You have to go from whole to parts (Zoom Level) and from back to start (goal oriented, time oriented, what you want to achieve and when, and then plan it backward) to discuss periodization and to actually plan your training system.

Recently there was a great deal of discussion and confusion when it comes to Second Zoom Level. With most of the sports there are numerous training goals (motor abilities) that need to be achieved/developed in order to improve performance. Some of those goals are compatible and some are not, some lean on each other (related and dependent on each other) and some of them don't. The question that arises is how to approach the development of those multiple goals in predefined time and context defined by First Zoom Level? IMHO there are two distinct approaches: **parallel** and **serial development**.

Parallel approach develops all defined motor abilities at the same time. Depending on the definition of the 'same time' this approach may have different variations. For example, all defined motor abilities may be developed in one training session, one training day, couple of training days and one training microcycle (usually a week).

Parallel Development
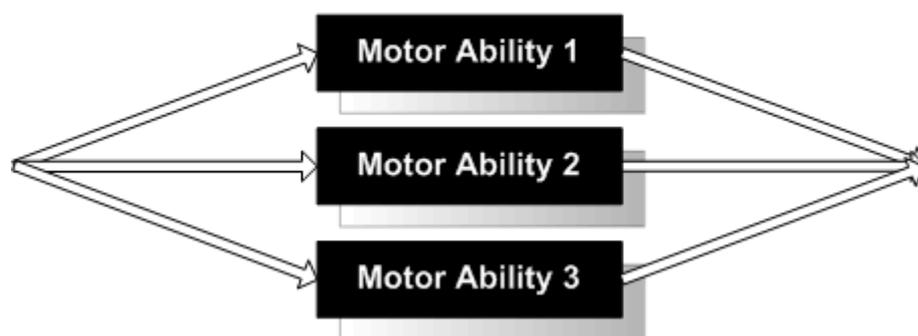
Serial approach develops motor abilities one-after-another in sequential/consecutive fascion. Depending on the order of the development numerous variations can be indentified.

This is the first error that I see people do when discussing the Second Zoom Level. What people are forgeting is that there is a **continuum** between these two extremes, and, more importantly - the parallel and serial approaches are vague terms (!!) that depends on classification of the motor abilities and training goals that must be developed in the first place.

Parallel Development   **Serial Development**

Traditional training approach utilize Parallel development, hence the term concurrent and complex-parallel. And now comes the confusion! There is a lot of information out there that states that traditional approach is actually sequential (serial). Sequential models originated post complex-parallel, and to address some of the shortcomings of this system with respect to elite athletes. Anyone who try to portray concurrent methodologies as something new, all the rage, the funeral of sequential models, is, in fact, wrong. Traditional training approach is/was actually a concurrent approach, where all the abilities were developed simultaneously.

With elite athletes, problems with traditional training approach started to emerge. In order to continue to improve at a given motor ability, elites would need more and more volume of training and since all abilities are developed simultaneously, excessive (total) volume was needed. This was time where doping was neccessary evil to sustain troumenduous training volume, along with becoming a full-time athlete, training couple of times per day. There is a trend in volume reduction after the AAS ban and prohibition.

Complex-parallel approach as any other has it pro's and con's that should be taken into account when chosing your approach. Depending on the level of the athlete, sport, time aviable and other factors, complex-parallel approach may be the best solution there is. Some important factors must be taken into account when using this approach, like optimalization of training time and motor abilities, design of the microcycle depending on the compatibility of motor abilities, wave-like loading, etc. Anyway, this approach is one of the best solution when working with kids and low level athletes and with some more advanced athletes that don't have much time to develop motor abilities (take for an example proffesional soccer player who have 1-2 months of preparatory period).

As a side note, complex-parallel training systems in non-strength sports is very different than complex-parallel (concurrent) strength training in powerlifting, weightlifting and strongman training. First of all, in strength sports the barbell is the sport, its the iron game and the purpose of the training is to improve the lifts by improving various motor abilities that determine succesfull performance, like technique, absolute and relative strength, speed, mass, sticking point, lock-out, grip, gear work, etc, while in non-strength sports, strength training have a purpose of injury-prevention, increase on-field performance, etc. In non-strength sports this is far more simpler, with much less details. This is why most, if not all, athletes from non-strength sports never reach advanced level of strength training. They usually need novice and intermediate planning with couple examples of more advanced planning of strength training. They need to juggle with more motor abilities besides strength. This is why their Second Zoom Level is more 'zoomed out' when it comes to strength training compared with strength sport athletes which need more detailed 'zoom level'.

Block approach was designed with advanced athletes on mind, who cannot develop everything at once. They need to prioritize the training goals or they will suffer from overtraining and limited progress. So, during Block training one or more compatible motor abilities are developed, and after some time the training 'switches' to another set of abilities. One training block is a time period of unidirectional and concentrated loading aimed at developing one or more compatible motor abilities. With this approach, total training stress is less when compared to complex-parallel approach, but individual stress (aimed at one or more motor abilities) is greater, hence the term *concentrated loading*. Block training utilize the following training principles:

Delayed transformation
- This principle entails the transformation of the training load into improved performance. Peak performance will not normally occur during periods of heavy training due to the accumulation of training fatigue and the time that adaptation to training loads require. Thus a period of easier load is needed to demonstrate the results of previous training. This is a basis for taper and pre-competition blocks.

Delayed transmutation
- This principle states that in order to realize performance improvements, specific exercises and loads must be utilized to transmutate (transform) and maximize the fitness acquired during previous training stages. For example, after you increased relative strength via strength block, you need to spend some time sprinting or jumping to 'transmutate' relative strength to speed or jump ability. This is a basis of 'conjugations' of the blocks, so that training effects of the preceeding blocks is maximally utilized during the second one, achieving more than just the mathematical summ. Also, this is where 'special' exercises comes in, to transmutate more general training effects.

Training residuals
- When training is designed in traditional manner and many abilities are developed simultaneously, the risk of detraining is negligable because each quality receives some proportion of training stimuli. However, if these abilities are developed consecutively, as proposed in block approach, the problem of detraining becomes very important. If you develop one ability and lose another one at the same time, you have to take into account the duration of the effect of the given training after its cessation and how fast you will lose the obtained ability level when you stop training it. In other words, you have to know residuals effects of each type of training. The rate of loss of training effects and respective training residuals vary widely for different motor abilities

Superposition of training effects
- Development of one motor ability can have a positive or negative effect on other motor abilities. Blocks needs to be sequenced optimally to ensure that training in subsequent blocks enhances the work carried out in previous mesocycles. Along with delayes transmutation principles, superimposition of training effects is a basis of 'conjugations' of the blocks, achieving greater training effect than just the mathematical summ

Basically, Block training is not just random sequencing of motor ability development. It needs to be well though based on delayed training effects and training residuals, so that the best performance is achived at the most important time.

There are couple of Block systems out there like Bondarchuk system, Verkhoshansky system (CSS – Conjugate Sequence System) and Issurin system (BPC – Block Periodization Concept), with their own implementation of mentioned ideas.
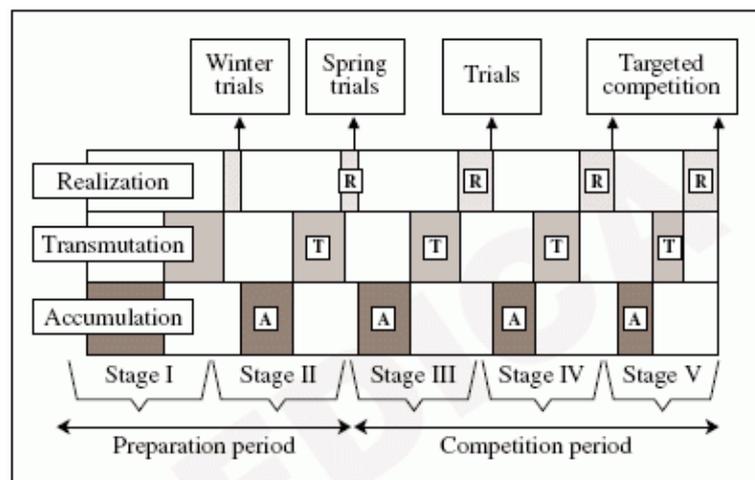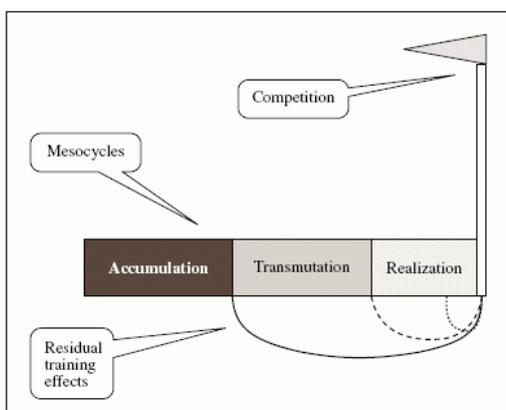
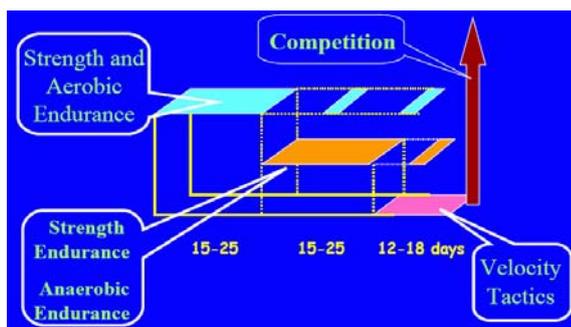**Issurin Block Periodization concept**
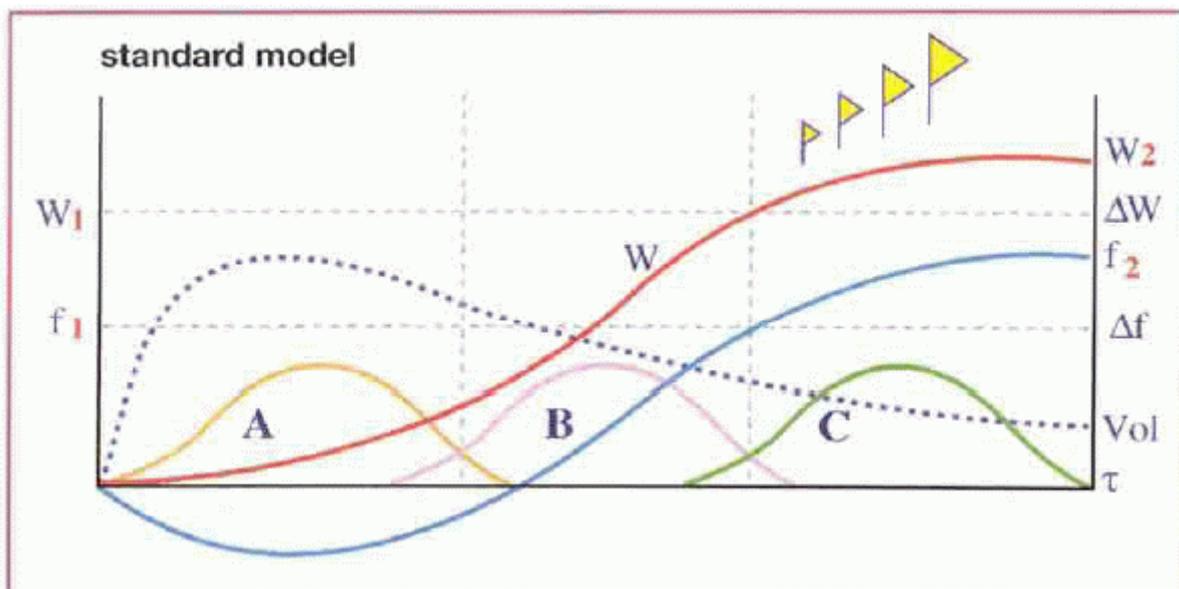
Verkhoshansky Conjugate Sequence System

I guess the main differences between Verkhoshansky ans Issurin models are that Verkhoshansky puts strong emphasis on strength and special strength block and purposelly induce delayed training effects (via over-reaching), while Issurin does not do that (at least it doesn't go into much detail on this very topic in his book), but I could be wrong. I would love to discuss this models in futher detail, but I guess they are a topics of another article(s).

This leads me to one interesting topic – *maintenance*. *Maintence principle* states that when you stop developing one ability, that ability start to decline ('Use it or lose it!' law), along with the fact that loads (retention loads) aimed at maintaining one ability are far less than loads neccessary to develop one ability. In Block training there is no maintenance training for non-targeted motor abilities. If you look at Verkhoshansky model, during strength block, maximal strength actually falls down and later it raises again and suprass initial values (delayed effect). So, doing strength maintenance work during subsequent blocks may increase the time needed for strength to 'jump up', and screw the whole point of conjugations. This is why knowledge of residual training effects is of extreme importance in devising block training system. On another look, what are you going to maintain anyway? Decreased strength potential after strength block? In his book Issurin mentioned inclusion of mini-blocks (lasting 2-4 days) aimed at maintaining previously developed abilities. I guess the problem of maintenance loads on non-targeted abilities is highly specific to a given variation of the system, especially wheather there is usage of delayed training effects, which IMHO don't need maintenance work, at least not in negative phase (over-reaching phase) of the curve. For example, after 4 weeks of strength block that caused acute over-reaching and depression of maximum strength, you don't need maintenance loads for about more 4 wks, as it usually takes for the delayed training effects to take place (same as loading time). After that, you may utilize maintenance loads to maintain new reached strength levels, but that depends on the structure of block training.


Issurin Block Periodization concept – Mini Blocks concept

One of the problems with Block periodization are injury issues. Remember when you tried new routine last time? Yeah, you got sore and stiff. I also know from experience that when more advanced team athlete starts to seriously strength train, he will feel 'stiff' for a week or even two. This happens when there are clear and sudden transitions of training components. For example, when you switch from strength block to plymetrics block it could be pretty risky, and expect long lasting 'stiffnes'. Stiff muscles and stiff nodes and knots can make you strain your muscle more easily. To avoid this issue of 'adaptation stiffness' (Charlie Francis term), one high intensity training component could be performed at very low volume, so it would not interfere with other training components. Utilizing this approach will avoid 'adaptation stiffness' when the component is reintroduced on a larger scale. Yet, again this brings us to *maintenance priciple* and maintenance loads.

Before I introduce Emphasis/Pendulum approach, I must remind you that these two examples (traditional & block) are extremes and there is a continuum in between them. So, every Block system must utilize concentrated/unidirectional loading, delayed and residual training effects, but not every system that utilize those principles is Block. Same for the traditional (complex-parallel) approach. Traditional approach must utilize parallel (simultaneous) development of multiple abilties at the same time, yet not every system that utilize parallel (simultaneous) development is traditional. There is a lot of space in the continuum between for various solutions, and one of the is Emphasis/Pendulum approach, which IMO utilize good stuff from both extremes.

Emphasis/Pendulum training approach is basically something in the middle between two extremes: serial and parallel approach and complex-parallel and block approach. I don't know whether this approach is named Emphasis/Pendulum in scientific circles, but I got this idea from one great discussion at Charlie Francis forum. As Charlie use to say 'Everything is done, only the volume varies' or in other words all training components are being performed simultaneously, at all times and only the volumes vary, from week to week, from mesocycle to mesocycle. Charlie Francis calls this *Vertical Integration*. More about his system can be found in recent e-book entitled 'Key Concepts – Elite Edition'.

Basically, the premise of Emphasis approach is the fact that advanced athletes cannot improve everything at once, so they need more unidirectional loading (emphasis) with concentrated loading aimed at improving one or more compatible motor abilities. This is same as Block approach. On a side note, Emphasis approach utilize maintenance principle and complex-parallel development of non-targeted motor abilities. This approach is thus great solution for advanced athletes to futher improve their abilities with the minimal risk of injury and detraining. This is accomplished with unidirectional loading and maintenance loads. The following picture is taken from Zatsiorsky book 'Science and practice of strength training', where conventional planning is actually serial approach, and 'New planning' is Emphasis approach.
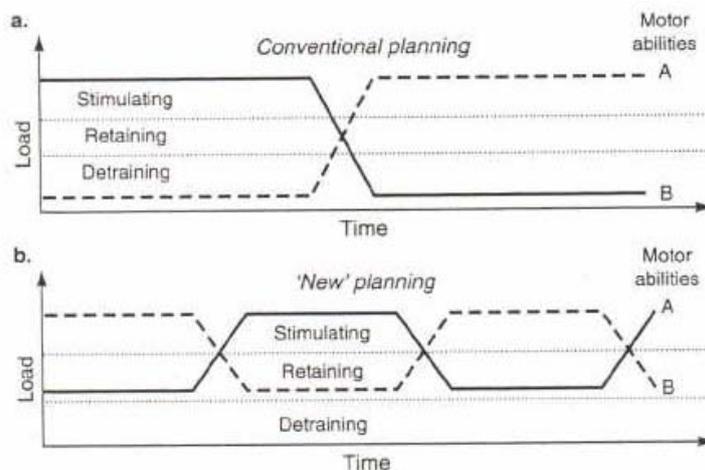
Taken from Zatsiorsky, Vladimir (1995). *Science and practice of strength training*. Human Kinetics

Emphasis and maintenance loads can be manipulated by training intensity, volume, frequency, etc, depending on the training system, sport, etc.

These are in short, IMHO, different approaches to deal with Second Zoom (planning) Level. I haven't touched the First Zoom Level that much for the reason that this level is one of the most 'documented'. The next thing we are going to deal with is some stuff from Third Level of Zoom, called load.

LOAD AND LOAD CLASSIFICATION

Load is a part of *training triangle* – **means**, **methods** and **loads**, that represent 'input' to any training system (*training tool*), or training stimuli/stress that influences athletes state, triggering adaptation processes which eventually leads to different training effects (immediate, delayed, cummulative, residual, etc).

Defining load is also hard thing to do. It describes quantity and quality of training stress/stimuli caused by training means and methods. We may also look at the load under different **time frames**, like exercise load, training load, daily load, weekly load etc.

Depending on the author, there are different components of the load. For the sole purpose of this article I will define the following load components:

1. **Intensity**
2. **Volume**
3. **Duration and quality of rest period**

Some authors also define **training frequency** as another load component, but this depends on the time frame under which we actually analyse training loads. We will deal with training frequency later, and for now we will stick to intensity and volume, since they are one of the most important components of the training load. Another component may be a **difficulty of the exercise** too.

Intensity in strength world is a weight on a barbell, or percentage of individual 1RM. It can be presented in absolute terms (weight), or in relative (percentage of 1RM or in nRM values). In another sports, intensity usually represent *quality* of work done, like velocity, height, pace, power, etc.

Volume represents ammount or *quantit* of the work (load) done. In strength world volume is measured with number of sets, number of lifts, tonnage etc. Volume can be represented in absolute terms (tonnage) or relative (normalized volume), and it can be also represented per intensity brackets (like volume in 80%-90% zone, etc).

There is also a term **intensivness** or **effort**, which usually causes confusion in strength world. Recently, Lyle McDonald has put one great article on this very subject entitled 'What is training intensity'. To cut a long story short, effort is a 'feeling' of how hard something feels to you at the time. For example, compare lifting 100kg for 6 reps and lifting it for 8 reps. Intensity is same (100kg), but the effort is not. Effort is usually represented with *RPE scale* and can be also represented with *proximity to failure*. So lifting 3RM weigth for 3 reps and lifting 10RM for 10 reps is equally hard, thus both have same effort or RPE value (although of different quality, due different system stress – CNS vs. muscular/metabolic), but very different intensity. Sense of effort, how scientists calls it, is basically a **perception** of load and its immediate effects on the body (its reaction), homeostasis perturbations and the work done by the body to maintain that homeostasis within normal limits. Thus, perception of effort is not only affected with intensity of the load but its volume too, and also with emotional state of the athlete, psychological stimulants, music, character etc. More interested geeks could read my Homoeostasis Performance Model to find more about it.

Mike Tuchscherer created very interesting training system that utilize RPE scale. More about this great powerlifting system can be found in his book The Reactive Training Manual. RPE stands for Rate of Perceived effort. Basically, every set has RPE value, based on the sense how hard it was, what speed the bar had and how close to failure you were. Mike uses the following RPE scale:

10	Maximal. No reps left in tank. Doesn't means going to failure thought
9	Last rep is tough, but still 1 rep left in the tank
8	Weight is too heavy to maintain fast bar speed, but is not struggle. 2-4 reps left in tank
7	Weight moves quickly when maximal force is applied to the weight. „Speed work"
6	Light speed work. Moves quickly with moderate force
5	Most warm-up weights
4	Recovery. Usually 20+ rep set. Not hard but intended to flush the muscle
<4	Not that important

Modified from Tuchscherer, Michael (2008). *The Reactive training manual.*

The easiest way to gauge RPE scale of a set, Mike states, is to ask yourself how many more reps you could've done with particular weight. Honesty is the absolute key here!

RPE system is far more accurate than any *percentage system* for many reasons, including the training history, ammount of fast-slow fibers, duration of the cycle, good and bad days, sleep, nutrition and supplementation. RPE system allows individualization, and after coaches and athletes understand it, it becomes very powerfull tool to individualize the training.

Anyway, there is a rough correlation between RPE scale and percentage of a given rep range. Mike have developed one chart as a starting point, to approximate RPE scale with a given percentage.

RPE	12 reps	10 reps	8 reps	7 reps	6 reps	5 reps	4 reps	3 reps	2 reps	1 rep
10	62	66	71	74	77	80	85	90	95	100
9	60	64	68	71	74	77	80	85	90	95
8	58	62	66	68	71	74	77	80	85	90
7	56	60	64	66	68	71	74	77	80	85

Modified from Tuchscherer, Michael (2008). *The Reactive training manual.*

Mike uses RPE scale to auto-regulate training, using stuff like fatigue stops, optimal training volume, fatigue percents etc. We will talk about auto-regulatory training in a moment.

For practical purposes, it is neccessary to define three general functions of a load/workout: *development*, *retention* and *restoration*.

Workout type	Load level	Approximate restoration time	Workout assesment, RPE
Development	Extreme	> 72h	10
	Large	48 - 72h	9
	Substantial	24 - 48h	8
Retention	Medium	12 - 24h	7
Restoration	Small	<12h	<6

Modified from Issurin, Vladimir (2008). *Block Periodization*. Ultimate Athlete Concepts

It is also interesting to depict the relation of load level and *possibility of setbacks* (injuries, stiffness, soreness, additional recovery time, etc), that impedes with training consistency.

Restoration (un)loading   Retention loading   Optimal developmental loading   Impact/shock loading

Training Effect

Possibility of Setbacks
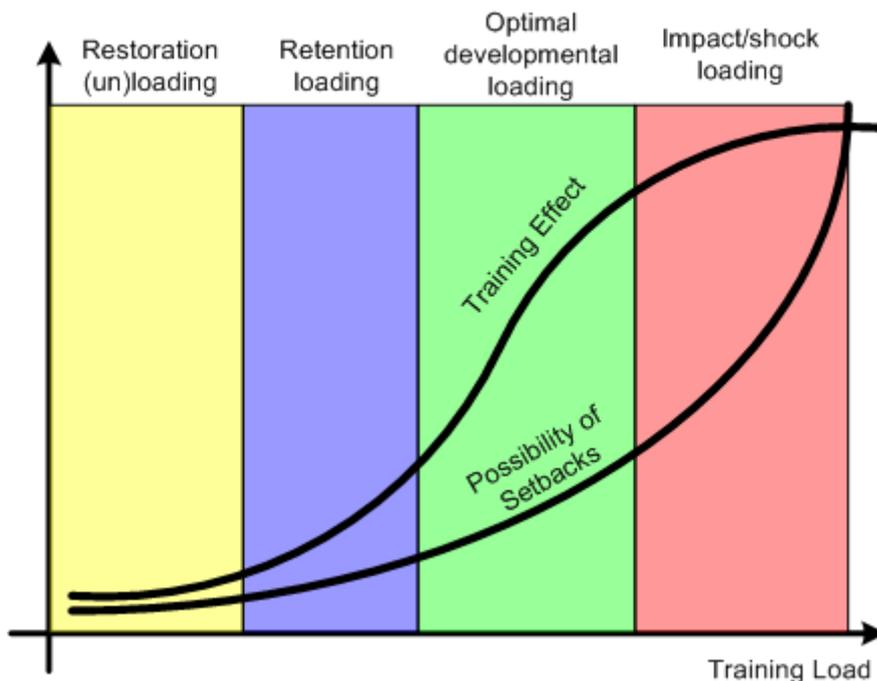
Training Load

Modified from Daniels, Jack (2005). Daniels' Running Formula. Human Kinetics

It can be seen clearly from the picture above, that there is a (sliding) **window of optimal loading**, under which there is optimal relation of training effects and possibility of setbacks. You get the biggest bang for your buck, and with minimal possibility of a setback. Using larger load level, will cause less and less training effect, but greater possibility of setback. I am not trying to say that this impact/shock loading is an absolute no-no, but rather it should be used sparringly and wiselly, usually with most advanced athletes.

One of the most important problems of the training are (1) how to find this optimal loading window, (2) when to stop loading, and (3) what to do after exceeding optimal loading, both in one training session and in longer training phases. Finding this optimal loading window inludes things like talking to the athlete, asking the right questions at the righ time, observing his performance (qualitativelly), measuring performance (quantitivelly), etc. This is why training is more an art than it is a science. Anyway, my current thought regarding this problem is, that along with logging training loads and observing effects (external performance and internal state changes, like mood, HR, bLA, etc) and making cause-and-effect relations, more important aspect is *hand-off* training approach. Hands-off training approach is based on guided-discovery idea, where you put an athlete into a situation demanding decision-making and guide him to find his own solution. Guided-discovery idea is currently a hot topic in motor learning theory and learning of sport games, but I guess it can be used with strength athletes too. This way athletes are not only an object of training process but actually a noun and verb too. Coaches are usually afraid to give 'freedom of choice' to their athletes, and usually utilize authorative training style and suffer from a need to control everything. I guess they miss a lot with this approach and may get ulcer too. The goal of training is to create more inteligente athletes, that are able to train themself using their own knowledge and sense. Utilizing auto-regulative training and using RPE scales (and learning your athletes how to use them), may be a major pain in the arse in short term, but in long term it may be very productive solution. I know there are dumb and lazy athletes that only wants to train, lift or compete, but creating (or helping athletes to create themself) a real champ imply teaching him how to listen to his body, principles of training and recovery. They need to be more involved in training process and decision making process. They must understand that it is about them anyway.

One solution to this problems are using RPE scale and auto-regulatory training, that we are going to deal with later in this article.

VOLUME-INTENSITY TRADE-OFF MYTH

As we have outlined, volume and intensity are unsplitable and principal parts of the load. There is one myth that exists and its called **volume-intensity trade off**. Yes, there is a trade-off, but it depends on time-frame under which you analyse the load. Under most shortest time-frame, there is trade-off between volume and intensity: the more weigth on the bar, the less reps you could do with it. Yet again, you can do 8 reps with 10RM and you can do 9 reps with the same load, so this volume-intensity trade off exists only on weight-repetition maximum (RM) relation, and there is no reason to use it on larger time-frame scales of loading (exercise load, workout load, microcycle load, etc). You could also do 3 sets of 3 reps with 3RM, or you could do 1 or 5 sets (depending on the work capacity, level and the purpose of workout) either. Managing volume and intensity is very important aspect of training and loading, especially with intermediate and advanced athletes and falling under to volume-intensity trade-off dogma limits you for numerous solutions.

Intensity and volume are NOT reversely related. All volume/intensity combos serve their purpose in training and here are couple of examples.

Volume	Intensity	Purpose
Medium	Medium	Bread and butter of training
High	High	Push one into mild overtraining (overreaching) and lead to greater gains once followed by a taper
Low	Low	Active recovery / deload
Low	High	Sets PRs
High	Low	Build foundation for stable gains

Modified from Tsatsouline, Pavel (2005). *Beyond Bodybuilding*. Dragon Door Publications.

It is true that one of the characteristic of advanced lifters is that their training must be organized into longer periods of time, and those periods progress from higher volume and lower intensity toward lower volume and higher intensity. That is basically a trade-off if you look at it that way, but there are also other solutions to train advanced athletes. It is important to *unlock* volume and intensity.

It is interesting to note that *linear periodization* or *Western periodization* is actually a misunderstanded Third Zoom Level (load progression) of advanced olympic lifters. Those guys spend some time at emphasising volume of training and technique at doing great number of sets at lower-medium percentage of their PBs in clean/jerk and snatch (i.e. 8-10 sets of 2-3 reps at 70-80% or something like that) and then transitioning to intensity phase utilizing smaller number of sets with greater intensity (i.e. 4-6sets of 1-2 reps with 80-90%). This way they approach planning the load for development of strength-speed neccessary of olympic lifts (*linear periodization*). How do they integrated development of strength-speed with other components like relative strength, muscle mass and reactive strength is a matter of Second Zoom Level.

But some wise guy(s) from Western hemisphere used this linear progression of the load (where lifters utilized great number of sets with 1-3 reps at lower intensity) that was used to develop strength-speed for olympic lifts and applied it to Second Zoom Level by utilizing 10-15 reps per set in volume phases and 1-3 reps per set in intensity phases and named it *Western periodization* (or others did this for them). This way they passed through whole repetition continuum and stressed most of strength qualities in serial manner. And then confusion started with the idea that you must spend some time with 10-12 reps to improve your 1RM. That's ok with the novices, kids etc, but this was acutally suggested to advanced lifters. Yes, there is time and place for this too, but the issue I am trying to emphasize here is that you cannot analyse one system using only one Zoom Level, you must understand all three of them.

And after those wise Western guy(s) defined western periodization (which was actually misunderstood load progression of olympic lifters – linear periodization), Westside guys (WSBB) critiqued its serial development of abilities and devised conjugate training (actually complex-parallel approach), as something new (which is certainly not, since complex-parallel approach is the

traditional/first one). Lately, Westside guys also utilized Accumulation/Intensification phases (or Volume-Intensity phases) in their load progressions for a given strength ability (usualy maximum strength and ME method) and also started to emphasize given quality over a certain period of time and then the things started to go in circle again.

People were/are confused. They don't know what linear periodization means, what is traditional, what is concurrent, what is western, what is block, what is conjugated. I am not saying I know, but things start to finaly open. This is because they don't see the big picture and don't have Three Zoom Levels. It all started with the fact that advanced athletes need more volume-intensity alternations (volume phase, intensity phase) as a method of load progression (Third Zoom Level) to futher develop certain motor ability. Then some wise guy(s) applied this principle to whole repetition continuum which affected Second Zoom Level and appeared that all motor abilities are developed sequentially/serially. And this is the root of this problem.

So, the solution is to look at the problem from Three Zoom Levels. There is (1) planning of the season, there is the (2) approach to develop multiple motor abilities (complex-parallel, block, emphasis) depending on the level of the athletes and there is (3) planning of the loading for a given abilities again depending on the development, organization and level of the athlete. Do not mix those three levels of planning and there will be no confusion.

TRAINING FREQUENCY AND WORK CAPACITY

Managing training intensity, volume and frequency are key for optimal loading and training adaptation, avoidance of setback and overtraining. Training frequency is a term that is also hard to define like intensity and volume. Some authors consider training frequency as number of training session in a microcycle, some of them define it as number of training sessions per muscle group per microcycle, or as number of training sessions per training goal.

Basically, you need to take into consideration both definitions, since you need to take into account muscle loading, central nervous system loading, endocrine system loading and the joints loading (maybe some more, but can't remember now)

Training frequency depends on a lot of factors, like training goal, training phase, level of the athlete and work capacity. Numerous training systems are different variations of intensity, volume and frequency combos.

Work capacity is also hard to define and usually it is context-dependent and has also a huge number of subtypes. Basically, work capacity is the ability to sustain training load and recover from it efficiently. You cannot develop work capacity by doing bunch of sled work and intervals. This will develop a form of aerobic power that could be used to speed up recovery between sets, but this also depends on sets type (what repetition continuum zone). Work capacity is usually something that must be looked at larger time-frame (like microcycle), and it is something that develops over the years. Basically, you can manage to survive a given training session, but you may not actually recover from it in matter of days even weeks due poor work capacity. Factors that affect training frequency also affect work capacity, like muscle loading and ability to recover from it, central nervous system loading and toleration for such a work, endocrine system loading and ability to recover from it and joint loading and ability to sustain it.

Thus, the optimal training frequency depends on the goals of training, intensity and volume of training and fatigue type they develop (muscular, CNS, endocrine, joint...), level of the athlete and work capacity.

Type of loading/fatigue	Description
Muscle loading/fatigue *Local effect*	Volume of eccentric loading and work done. Proximity of failure (greater eccentric stress). Note that micro-trauma and total protein break-down in a workout can affect CNS via inflammatory cytokines.
CNS loading/fatigue *Central effect*	Volume of compound movements (great muscle mass and total MU recruitment), volume of work in >90% 1RM, proximity of failure (intensivness, RPE of sets, psychological effort), speed of contraction, ammount of micro-trauma and total protein break-down (volume of eccentric contractions) via inflammatory cytokines
Endocrine loading/fatigue *Central effect*	Total volume of training
Joints loading/fatigue *Local effect*	Total volume of training above certain threshold. Note that micro-trauma in a workout can affect CNS via inflammatory cytokines

One thing that I realized when working with soccer players (not directly related to strength training, but it is highly related to this work capacity issue), is that it is very easy to prepare them for one match. Most of them can play on 'freshness' as they use to call it. But, after that match, they will need more recovery days, and this will limit them in the long run due lowered technical and tactical skill work. Having poor work capacity will cause training and competition incosistency, or performance *swings*, usually with periods of setback and injuries in between. Thus, one of the goals is to prepare them not just for one match, but for the whole week loading and number of serial matches. Improved work capacity will improve training and performance consistency and allow them to have longer peak or play whole very long season with great performance and not swinging from match to match. Athletes with great work capacity (again, not just aerobic power but ability to sustain long term loading and recover from it) are allways on the *scene*, and guys will lower work capacity will be at peak every now and then, and most of the time injured. So, I guess the key to performance consisteny and sport success is high work capacity.

There is also an upper-end of work capacity which is actually a whole point behind block and emphasis approach of training. As you become advanced, you just simply cannot pound on everything at once and manage to recover from it, without setbacks, limited progress and overtraining. You focus your efforts on couple of things, make them move again and then switch. Rinse and repeat. That is the whole point behind block and emphasis approach and main limitation of traditional complex-parallel approach.

But don't think that improving work capacity is not possible. Let me cite Mike Tuchscherer from his The Reactive Training Manual, page 47:

It is important to note that if you don't elevate your work capacity, then you are setting up for early stagnation due to an inability to accomplish and recover from work. Basically, as you become more advanced and it takes more work to make gains, you won't be able to do more work because if you do, you will overtrain. This isn't something few weeks of sled dragging is going to fix. Work capacity is developed over the years of training, which is why it is vitally important not to forget about it in your current stage of training.

This brings me to the fact that some athletes are not that advanced that they need more advanced planning, they just suck at their work capacity, and maybe one solution to the problem is to develop their work capacity before going to more advanced stages, where the lack of it may limit their real potential.

One approach to this problem is to play with intensity, volume and frequency combos. Mike Tuchscherer suggests using two different combos from time to time in every training phase

Combo Name	Purpose	Organization
Fatigue-Based	To teach your body how to recover from large ammount of fatigue	The frequency is lower, but the fatigue induced by each session is high.

Frequency-Based	To teach your body to recovery from smaller bouts of fatigue more quickly	The frequency is higher, but the fatigue induced by each session is lower

<p style="text-align:center">Modified from Tuchscherer, Michael (2008). The Reactive training manual.</p>

Please note that the term fatigue reffers to total stress (load) induced by a workout. It is not simply volume and not simply intensity, its their interaction.

By rotating both into your training, your work capacity goes up, therefore your ability to accomplish and recover from training goes up too. Emphasising one combo and then rotating may be done on every level of training and with any goal too.

To conclude: to improve training adaptation, avoid setback and overtraining via improvements in work capacity, it is neccessary to manage intensity, volume and frequency combos of the training load. Case closed!

MICROCYCLES AND THEIR CLASSIFICATION

Microcycle is the shortest training cycle. It encopasses a number of workouts and lasts a number of days, most often one week. There are six types of training microcycles, characterized by specific purpose, load levels, particulars of workload design and duration. There is a differentiation between microcycles in three principle ways: *loading, competing* and *recovery*.

Microcyle type	Type	Purpose	Load level	Particulars
LOADING	**Adjustment**	Initial adaptation to workloads	Medium	Gradual increase in workload
	Loading	Fitness development	Substantial – high	The use of big and substantial workloads
	Impact	Fitness development by extreme training stimuli	Very high - extreme	Use and summation of extreme workloads
COMPETING	**Pre-competitive**	Immediate preparation for competition	Medium	Tuning for forthcoming competition, using event-specific means
	Competitive	Participation in competition	High – very high	Sport and event-specific performance
RECOVERY	**Restoration**	Active recovery	Low	Use of wide spectrum of restorative means

<p style="text-align:center">Modified from Issurin, Vladimir (2008). Block Periodization. Ultimate Athlete Concepts</p>

Load level within each microcycle depends on the frequency, volume and intensity of individual training sessions. Different combos of mentioned variables can be utilized to create different load level. This is very important in planning the training.

The desing and structure of the **mesocycle**, medium size training cycle that contains number of microcycle, depends on the Second Zoom Level (complex-parallel, block, emphasis) approach choosed, training goals and type of mesocycle, optimal loading and athletes work capacity (Third Zoom Level) and First Zoom Level (competition calendar) or time of competition and mesocycle position in larger training cycles (preparatory, competition, transition). A lot of factors to consider. Here are couple of generic examples:

Adjustment	Adjustment	Adjustment	Adjustment	Adjustment	Adjustment
Loading	Adjustment	Loading	Loading	Loading	Loading
Loading	Loading	Impact	Impact	Impact	Loading
Restoration	Loading	Impact	Restoration	Restoration	Loading
	Loading	Restoration	Impact	Pre-comp	Pre-comp
	Restoration	Restoration	Restoration	Competitive	Competitive

<p style="text-align:center">14</p>

More about possible mesocycle design and types will be said later in this article, when we are going to talk about different levels of the lifter

AUTO-REGULATORY TRAINING

Auto-regulatory training is about finding optimal ammount of loading to achieve desired training effects using your own perception or feel, along with some measurable and visible signs. The whole point is to make training individual, based on current state of the athlete and his work capacity.

There can be numerous application of autor-egulatory training in practice. Some may add that auto-regulatory training also includes measurement equipment, like force-plates, tendo units along with coaches qualitative evaluation, but IMO this is regulated training, not auto-regulated, where athlete himself have to regulate the training load based on his feel or perception.

Usually the training volume is the variable that is regulated with auto-regulatory training, since the training intensity is a measure of training quality and training effect seen. Thus, managing training volume you manage training stress or loading. The whole principle behind auto-regulatory training is a **critical drop-off** concept. A critical drop-off concept states that when intensity (in regulate training with measuring equipment and coach) or effort (an athletes sense or perception of work hardness) exits from pre-defined boundaries, the training (set, exercise, workout) should be stopped. Or in other words, when the quality (intensity) of work falls down below certain threshold, the training is stopped.

Mike Tuchscherer implemented this auto-regulatory principle (critical drop-off) in his Reactive Traning using RPE values and Fatige Stops. Fatigue Stops is a method of controling training volume (number of sets done) and thus controlling training load or stress. Mike goes even futher to advise not to pre-plan the number of sets. You should let your body be your guide, and if you should do more or less, your body will let you know. So, you basically do your sets, and when your strength level go down, or your RPE value goes up, you stop. This way, you hit optimal training volume/load. So, instead doing 5x5 with 80%, you can do sets of 5 @ 8-9 RPE value until you hit Fatigue Stop. Sometimes it is going to be 2 sets, sometimes it is going to be 6, depending on you level, work capacity, training day (good or bad, quality of sleep, nutrition and supplementation, spending nights drinking/partying etc).

Yet again, depending on the goal of the training, you want to over-stress yourself in order to supercompensate later (for example in impact microcycles with extreme loads). As I have stated earlier, critical-drop off point is quality-meter, when the training is stoped after the quality falls bellow certain threshold. So, if we move the threshold, we will affect 'fatigue stops' and thus training volume.

Since the quality in strength training is weight on the bar, allowing weight to fall for a given value until some threshold, we will affect training volume with auto-regulation, becuase we would be able to do more work although with reduced quality. Mike uses **Fatigue Percents** to manage training volume with auto-regulatory training by defining quality threshold via percent drop-off. Mike also uses time limits (ammount of time aviable for exercise) to manage training volume.

So, mentioned sets of 5 @ 8-9 RPE can be managed to induce given load/stress level by allowing weight on the bar to fall for a given percentage. Mike uses the following percentages:

Very High Stress	10% drop-off
High Stress	7% drop-off
Medium stress	5% drop-off
Low Stress	3% drop-off
Deload stress	0% drop-off

Modified from Tuchscherer, Michael (2008). *The Reactive training manual.*

For example, if we do squats for 5 reps @ 8-9 RPE with 150kg, and we want to induce medium volume-stress, we could (a) instantly reduce weigth for 5% to 142.5kg and keep doing set until our RPE is no longer 8-9, or (b) progressivelly reduce weight from set to set to be @ 8-9 RPE value until 5% drop-off is reached. Certainly, different average intensity and total volume will result from these two approaches, so a lifter can use one or another approach in different phases (for example intensity phase or volume phase – mesocycle).

Sometimes, the number of reps will fall (for a given RPE) before you can manage weight on the bar to reach certain drop-off. To quantify drop-off from rep decrease, Mike suggests the following values:

Initial number of reps	1 reps less	2 reps less	3 reps less
1	5%		
2	5%	10%	
3	4%	8%	12%
4	4%	8%	12%
5	3%	6%	9%
6	3%	6%	9%
7	3%	6%	9%
8	2.5%	5%	7.5%
9	2.5%	5%	7.5%
10	2%	4%	6%
11	2%	4%	6%
12	2%	4%	6%

Modified from Tuchscherer, Michael (2008). *The Reactive training manual.*

Taking our sets of 5 @ 8-9 RPE as an example again, to reach 5% drop-off and induce medium stress, we could continue doing sets until we can manage to do 3 reps with same weight @ 8-9 RPE. This will also affect total volume and average intensity compared to previous two example. Here is the hypothetical example for sets of 5 @ 8-9 RP with 150kg starting weight, using these three mentioned approaches to drop-off calculation for Medium Stress (5% drop-off)

Progressive weight decrease approach	Instant weight decrease approach	Less-reps approach
1. set: 5 reps X 150kg @8 RPE 2. set: 5 reps X 150kg @9 RPE 3. set: 5 reps X 147.5kg @9 RPE 4. set: 5 reps X 145kg @9 RPE 5. set: 5 reps X 142.5 kg @8 RPE 6. set: 5 reps X 142.5 kg@9 RPE 7. set → not done	1. set: 5 reps X 150kg @8 RPE 2. set: 5 reps X 142.5kg @7 RPE 3. set: 5 reps X 142.5kg @7 RPE 4. set: 5 reps X 142.5kg @7 RPE 5. set: 5 reps X 142.5kg @8 RPE 6. set: 5 reps X 142.5kg @8 RPE 7. set: 5 reps X 142.5kg @8 RPE 8. set: 5 reps X 142.5kg @9 RPE 9. set → not done	1. set: 5 reps X 150kg @8 RPE 2. set: 5 reps X 150kg @9 RPE 3. set: 4 reps X 150kg @8 RPE 4. set: 4 reps X 150 kg @8 RPE 5. set: 4 reps X 150kg @9 RPE 6. set: 3 reps X 150kg @9 RPE 7. set → not done
Number of lifts: 30 (-25%) Tonnage: 4387.5kg (-23%) Average weight: 146.25kg (-2.5%) *Average RPE: 8.6 (0%)	*Number of lifts: 40 (0%) *Tonnage: 5737.5kg (0%) Average weight: 143.43kg (-4.38%) Average RPE: 7.75 (-9.8%)	Number of lifts: 25 (-37%) Tonnage: 3750 (-34%) *Average weight: 150kg (0%) Average RPE: 8.5 (-1.16%)

Something tells me that less-reps approach is more appropriate with sets of higher reps (RE work) for example 5 and higher, and weight decrease approach is more appropriate for sets with lower reps (ME work). Also, from the table above we can see that different approaches to auto-regulatory training yield different tonnage (volume), average intensity and average effort (RPE). For example, less-reps approach can be used in phases where intensity is dominant, instant weight decrease approach can be used in phases where volume is dominant, and progressive weight decrease can be used in phases where intensivness (effort) is dominant.

I must admit that this kind of drop-off calculation is hard even with straight sets, but extremly hard with stage and wave sets (see *Concurrent strategies in strength training*). To make things even complicated, your RPE can change from set to set. You could also calculate average RPE for exercise if you don't want to stick to a given RPE bracket (to call it that way). You need to be extremly experienced with this system to use it properly, thus this kind of load auto-regulation is reserved for advanced and experienced lifters.

VOLUME AND INTENSITY PHASES

As we have pointed out, volume and intensity of training are two principal components of training load. They are also NOT reversly related. So, one can obtain simmilar levels of loading by emphasising one over the another. I have also mentioned that training of advanced lifters must be organized into longer periods of time, and those periods progress from higher volume and lower intensity toward lower volume and higher intensity (more on this later). You can arrange this using more subtle progression (*linear periodization*), or switching from Volume Phase (or Accumulation) to Intensity Phase (or Intensification) more abruptly. Those phases are mesocycles or blocks.

Volume and Intensity phases are two ways to get you stronger, yet they develop strength in slighty different way at the motor-unit level. Sometimes Volume phase is used to elicit delayed training effect via acute over-reaching (but in this case the both volume and intensity must be higher), and Intensity phase is designed to utilize those delayed training effect (but in this case volume must be lower and intensity higher).

Along with defining Volume and Intensity phases, one may use Fatigue and Frequency based cycles that constitute one or more Volume/Intensity phases.

Ordinary Cycle		Fatigue Based Cycle		Frequency Based Cycle	
Volume	Intensity	Volume	Intensity	Volume	Intensity

Please do NOT equate Volume phase with hypertrophy phase and Intensity phase with maximal strength phase! Volume and Intensity phases are a way of load progression/planning (Third Zoom Level) and Hypertrophy and Maximal Strength phases are a way of organizing training goals (Second Zoom Level) and in this case serial manner. Volume and intensity phases can be utilized for the development of all motor abilities (see the following table for hypothetical examples)

	Volume phase	Intensity phase
Maximal strength (ME)	Pre-set 6 sets X 2 reps @ 8-9 RPE Auto-regulatory Sets of 2 reps @ 8-9 RPE w/ Fatigue percents (Instant weight decrease approach)	Pre-set 3 sets X 2 reps @ 9-10 RPE Auto-regulatory Sets of 2 reps @ 9-10 RPE w/ Fatigue percents (progressive weight decrease approach)
Strength-Speed (Olys)	Pre-set 8-10 sets X 2-3 reps @ 6-7 RPE Auto-regulatory Sets of 2-3 reps @ 6-7 RPE w/ Fatigue percents (progressive weight decrease approach) or use tendo unit	Pre-set 3-6 sets X 1-2 reps @ 8-10 RPE Auto-regulatory Sets of 1-2 reps @ 8-10 RPE w/ Fatigue percents (progressive weight decrease approach) or use tendo unit

Hypetrophy	Pre-set 4-6 sets X 10-12 reps @ 8-9 RPE Auto-regulatory Sets of 10-12 reps @ 8-9 RPE w/ Fatigue percents (instant weight decrease approach)	Pre-set 2-4 sets X 8-10 reps @ 9-10 RPE Auto-regulatory Sets of 8-10 reps @ 9-10 RPE w/ Fatigue percents (less-reps approach)
Muscular endurance	Pre-set 4-6 sets X 20-25 reps @ 8-9 RPE Auto-regulatory Sets of 20-25 reps @ 8-9 RPE w/ Fatigue percents (progressive weight decrease approach)	Pre-set 2-4 sets X 15-20 reps @ 9-10 RPE Auto-regulatory Sets of 15-20 reps @ 9-10 RPE w/ Fatigue percents (less-reps approach)

BEFORE WE MOVE ON, LET'S SUMMARIZE!

We have covered a lot of ground here, so we should do a quick summary before we go into the application of it.

Most of the information that was covered is general in its nature. That means it can be used in training for sports not just strength-sports.

I have explained three levels of planning or Three Zoom Levels when analysing training systems. First level deals with training periods, competition calendar, long term athlete development and such. Second Level deals with definition of key motor abilities needed to succeed in a sport and it deals with three approaches used to organize their development. Here we talked about parallel development used in complex-parallel or traditional approach, serial development used in sequential or block approach and a blend between the two with emphasis/pendular approach. Each of this approaches has its own pros and cons, thus they may be optimal for a given athlete, for a given goals under a given context and they may not be. It must be said that block systems can utilize delayed training effects via acute over-reaching causing training loads, or may utilize residual training effects. This depends on the design of the block system and ofcourse load planning under the Third Zoom level. Third Zoom level deals with finding optimal 'training tools' – methods, exercises and loads to develop/maintain motor abilities defined by the Second Zoom level. The term load was discussed, along with their principal components – intensity, volume, intensivness/effort and training frequency. The use of RPE scale was also explained. Training frequency was covered under the idea of work capacity development. Different types of microcycle was discussed, along with different combos of intensity and volume. Volume and intensity phases (mesocycles) were discussed from the aspect of load planning for advanced athletes. Confusion created by misunderstanded linear periodization into western periodization was discussed too. Concept of auto-regulatory training was explained, along with using volume (and thus loading) control with Fatigue Percents.

All of this mentioned stuff can be applied to all sports, because this is general training theory. In most of the sports strength training is only a training component within more greater system. The role of strength training in non-strength sports is a development of functional muscles mass, relative or absolute strength, explosive strength, reactive strength and injury prevention. This makes planning of strength training for non-strength sports more easier than planning of the strength training for strength sports, where the development of the strength is sole purpose of the training system. For this reason, the development of the strength for strength-sports (olympic weightlifting, powerlifting, strongman, bodybuilding) is much more complex and targeted from different angles. Compared to non-strength athletes where they usually stops at intemediate planning, advanced strength athletes must deal with more complex structure of strength, especially the weak points and factors that limit the expression of their strength potential. So, compared to strength training of non-strength sports where most of the training is about doing cleans, squats, deadlifts, bench, press, rows, chins and lunges and dealing with loading

approaches and implementing it into sound training system, advanced strength athletes deals with more complex factors like grip, lockout, bottom and upper strength, gear work, weak points, sticking point etc. This makes planning of their strength training much more complicated.

Having that said, using complex-parallel, block or emphasis method to develop strength in non-strength sports is whole different issue than using them to develop strength in strength sports.

Since the most of the information covered in this article till now can be applied to all sorts of sports (general training theory), futher information will deal with its application to strength sports. I will try to show you how this info can be applied to planning the training of strength atletes of different qualification.

THE NOVICE LIFTER

No matter what sport athlete comes from, if he starts doing serious (not counting wellness experience here) strength training for the first time, he is novice. Be it experienced soccer player, bball player, olympic weightlifting begginer, powerlifting begginer or begginer bodyuilder he is ussualy weak as a kitten and skinny or sometimes fat (although I will not go into nutrition caunceling here – go to John Berardi and Lyle McDonald for this).

The main characteristics of novice lifter is that he needs very simple planning and his strength grows up rapidly. Mark Rippetotoe provides excellent explanation of all phases of the lifter in Practical Programming book, and his work will be used here as a template. Here is a short overview of novice characteristics:

1. Novices progress from training session to training session (Linear progression in weight - PBs)

2. Novices need small number of lifts

3. Novice will not develop overtraining that easily and on the other hand, if they do, the signs will be hard visible (which is 'bad').

4. The more advanced the athlete, the longer the off-period and the drastical the reduction in weigth and volume needed.

5. If novice start to 'stuck', simple off-day (with reduced weight) is enough to recover them.

6. If the unload is used, weight should be reduced for 10% and the cycle should begin once again.

7. If the novice show constant need for off-day, then he should progress toward intermediate level.

8. The end of novice phase is marked by performance plateau occuring sometime between the third and ninth month of training, with variations due to individual differences.

The goal of novice phase is to learn to lift (develop technique) and develop strength. Rippetoe suggest using 5 reps per set, because this allow both increase in strength and mass gain (depending on the nutrition and other training) without the distruption of the technique due too much reps per set. This also allows easier progression in weight (e.g. you can use greater weight jump if you use 5 reps per set, then 10 reps per set).

Yet again, the design of strength training program for novice lifter depends on the goals of that program, other training components (for non-strength athletes), training phase, etc. But basically, all novice can start on a program simmilar to Starting Strength Model outlined by Mark Rippetoe.

Monday	Wednesday	Friday
Squat	Squat	Squat
Bench Press/Press	Press/Bench Press	Bench Press/Press
Chin-Ups	Deadlift	Pull-Ups

Taken from Rippetoe, Mark (2007). *Practical Programming.* Aasgaard Company

Squatting, deadlifting, benching, pressing, rowing and pulling are basically all that is needed. Variation will offcourse depends on an individual, his sport etc, etc. For example, here is the generic variation I love to use with novices:

Training A	Training B
Squat	Squat
Bench Press	Military Press
Barbell Rowing	Chins/Pull-ups w/band (or Lat pull-down)
Lunge (or Split Squat)	RDL

Training can be done 2-3 times per week and Total Body Split is preferable in the novice phase. Depending on the circumstances one may utilize Total-Total-Upper; Total-Lower-Upper; Lower-Upper-Upper; Total-Upper-Upper as an example for non-strength athletes that started lifting during the in-season and want their legs 'fresh' for the match on sat-sun. Note to those athletes: expect soreness and heavy legs for about 1-2 wks since starting this program anyway. This is normal 'adaptational stiffnes' when introducing new high-intensity component to your training.

Lower	Upper
Lower 1	*Upper 1*
Squat	Bench
Lower 2	Barbell Rowing
RDL	*Upper 2*
Lunge (or Split Squat)	Military Press
	Chins/Pull-ups

I found that teching Romanian Deadlift, which is IMO the hardest exercise to teach due back position awareness, for this sole reason I find it the most usable. The athletes will learn how to keep neutral position, and when weights go over 60kg for RDL I slowly introduce Dead Lift (because plate size and bar heigh on the floor). Learning back position awareness in a long term is something you want your athletes to develop. Sometimes I don't teach Deadlift if the athlete is too tall or lacks flexibility, until he is able to utilize good technique.

To teach squat I use box. I don't do powerlifting squats (wide stance, low bar position), but rather a variation simmilar to Olympic squating style (high bar position, medium-confortable stance, heels shoulder wide, toes slighty out depending on the comfort). I also demand for key things to be proper and other things, like personal style and comfort, I let athletes choose by themself (this is something like *hands-off* approach we talked about before). We are all different. I use the box to teach them butt-back and sitting down with weight on the heels. Sometimes they need to sit on the box in order to fix their posture, etc, but usually I ask them to slightly touch a box. After a given number of sets, or training sessions, during the middle of the set I tell them that I am going to pull out the box and *voila* they squat. I ask for parallel depth (quads parallel to floor), but some athletes lack hip and ankle mobility to do it without flexing their backs or going to toes. I couldn't do it either when starting, so my squat depth increased over time and I am now able to squat very deeply with spine in neutral and knees aligned. You can use box again but this time play with its heigh. After some time let them try lower heigh box and start all over until they are able to squat to parallel.

Along with back position awareness, with athletes who cannot squat to parallel, RDLs are excellent way to develop posterior chain. To teach athletes RDL, I use various techniques and isometrics seems to work just fine for couple of sets, training sessions or weeks. Same goes for all the lifts – if athletes sucks at dynamic movement try isometrical holds for 10-30sec. Then while he is holding a position fix his posture or cue. Another thing that worked for me when teaching RDLs (when I tried to teach 30 soccer players how to do it), was make them stand with their backs near the wall. As they start to RDL, tell them to touch a wall with their butts. Keeps the spine neutral, knees slighty bent and chest up. This will teach them to push the butt back. Another thing I used with recreative athletes (we had women of 30-50 doing RDLs) is to mimic Japanese bow – salute. Cueing at the right time comes from experience and working with very 'movement stupid' (low awareness of their own movements) athletes.

Reps per set are usually 5 when learning out, but can be different during/after the learning period depending on the age of the athlete, physical state, muscle mass goals, injuries etc. Here is the table that me and my colleague Ognjen Milić developed for the purpose of LTAD (long-term athlete development) plan when we worked at tennis club together.

Exercises	Boys: 9-11 Girls: 8-10	Boys: 12-13 Girls: 11-12	Boys: 14-15 Girls: 13-14	Boys: 16-17 Girls: 15-16	Boys: 18+ Girls: 17+
Primary	12-15 reps	10-15 reps	8-12	5-10	1-5
Secondrary	• Complexes	• Complexes	10-12	8-12	5-10
Auxiliary	• Circuits	• Circuits	10-12	8-12	8-12
Corrective/prehab			12-15 reps	12-15 reps	12-15 reps

We have used this table when planning complex-parallel (concurrent) strength training utilizing *Priority Lifts* method (see Concurrent Strategies in Strength Training) for intermediate lifters (non-strength athletes). For novices look at Primary and Secondary categories. Primary can include squat, bench and press, while Secondary may include Chins, Rows, RDL and Lunges (or Split Squats) depending on the sport, athlete, etc.

Because the goals of strength training for novice lifters are technique, strength and usually muscle mass, one may wonder what is the best approach to plan the development of those abilities (Second Zoom Level). Well, since they are begginers, whatever they do correctly, they will gain strength, muscle and learn technique. So, basically doing sets of 5 reps will develop both mass (depending on nutrition and other training), strength and technique. This can be considered complex-parallel, since the training effect will 'spill-over' to various motor abilities/qualities and they will be developed more or less simultaneously. Thus, there is no need for specialized loads to directly 'aim' at different motor abilities/qualities compared to intermediates and advanced athletes.
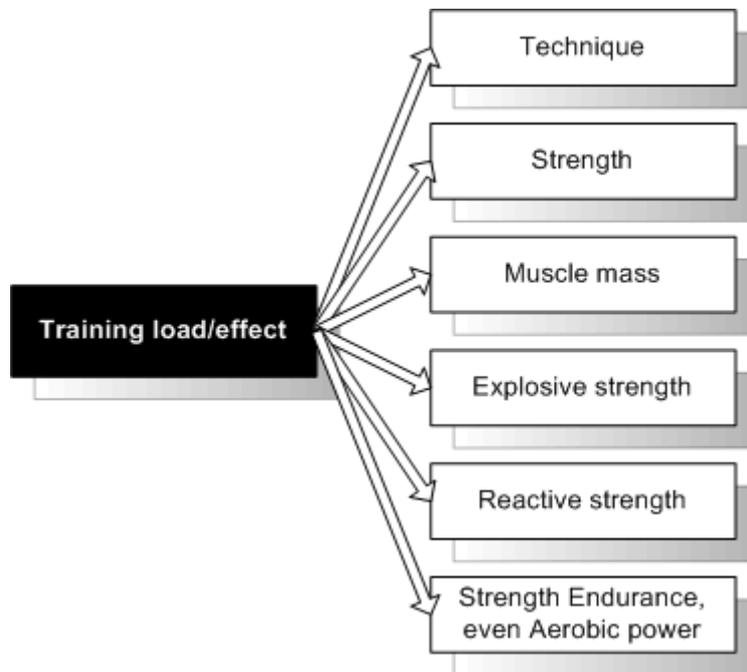
There is no need for more complex approach (sequential, complex-parallel, emphasis). On the other side, if we are talking about non-strength athletes whose strength training is integrated with other components into a sound training system, then the choice of Second Zoom Level depends on their level (in their sport), training phase etc. The Second Zoom Level will include more training components not just strength training compared to strength athletes

Bodibuilders may start to argue that there is a need to do 8-12 reps per set. But I guess with proper nutrition, both 5 reps guys and 8-12 reps guys will have simmilar if not the same results over time (if the resulting weigth on the bar is the same). Anyway, the first phase of strength increase is achived via inter- and intra-muscular coordination and there is very little muscle mass increase, so there is no real need for bodybuilding methods. Stick to 5 reps per set until you develop a minimum ammount of strength (intemediate phase) and then start doing bodybuilding methods. Increased strength will later allow you to lift greater weights for reps and thus stimulate growth more easily.

Before we move on, let's define the term **Personal Best (PB)** or **Personal Record (PR)** in strength training. Theoretically, PB is an increase in strength. Practically, this means achieving something you haven't achived before and demonstrating it, by lifting more weight, lifting the same weight for more reps or lifting it for more sets. For example, if your 1RM moves from 100kg to 102,5kg it's PB. If your 5RM moves from 85kg to 87.2kg its PB. If you do multiple sets, for example 5x5 and manage to do 80kg, but you suddenly do it for 5x6 or 5x5 with 82,5kg, its PBs. Thus PB is having more weight on the bar than 'before' for a given reps and sets. What about you make PB and don't train for a year and then restart training? Are all lifts below your old PB considered as non-PB lifts until you suprass your old PB? In reality – yes they are, but when it comes to planning they are all new PBs, because your strength level is lower now. So, PB is a all-time record, but it is also based on your current strength level and previous strength cycles. Another interesting point is RPE. What if you managed to do 3x5 w/100kg @7 RPE that couple of weeks ago seemed like 10? Yes, your strength has improved, but this is NOT PB! This can happen in unloading microcycles and in adjustment microcycles and its great (this shows you are stronger), but PB means surprassing previous cycle weigth/reps/sets or showing that new level of strength not 'perceiving it'.

There could be couple of phases of novices IMO (depending on the sport). The following examples are just hypothetical for average lifter, but can be used for powerlifter, olympic lifter and bodybuilder. Let's review them.

Phase 1. Athletes start to learn technique of the basic compound lifts for 5 reps for 3 sets. RPE is around 6-7, although he doesn't know that yet. On every training session you increase weight on the bar and achive PB, until load becomes 9-10 RPE. Take small step forward to avoid stalling too soon. If the athlete is unable to finish 3 sets with 5 reps on a given weight, repeat the weights for 3 times. Focus hard on technique, go as fast as you can on a way up, take more rest between sets, up to 5 min. If this doesn't help then deload – take 10-15% for that exercise and start over with progressivelly adding the weight. The first exercise to stall is military press. The less muscle mass involved with the exercise the sooner the stall with happen. Try deloading 2-3 times before moving to a next phase. If number of lifts falls down over training sessions (i.e. 5/5/4, 4/3/2...) then use harder deload – take 20% of the bar and do only one set for one week, then proceed to two sets and finally three. Here is the hypothetical example for squats:

Week #1	Week #2	Week #3	Week #4	Week #5	Week #6
40kg 5/5/5 @7	52.5kg 5/5/5 @8	60kg 5/5/5 @8	67kg 5/5/5 @8.5	75kg 5/5/5 @10	77kg 5/5/5 @10
45kg 5/5/5 @7	55kg 5/5/5 @8	62kg 5/5/5 @8.5	70kg 5/5/5 @9	77kg 5/4/4 @10	70kg 5/5/5 @7-8
50kg 5/5/5 @8	57kg 5/5/5 @8.5	65kg 5/5/5 @9	72kg 5/5/5 @10	77kg 5/5/4 @10	72kg 5/5/5 @8
Week #7	**Week #8**	**Week #9**	**Week #10**	**Week #11**	**Week #12**
75kg 5/5/5 @8	82kg 5/5/4 @10	67kg x5 @6	72kg 5/5 @7	75kg 5/5/5 @7	82kg 5/5/5 @8
77kg 5/5/5 @9	82kg 5/4/3 @10	70kg x5 @7	72kg 5/5 @7	77kg 5/5/5 @7.5	85kg 5/5/5 @8.5
80kg 5/5/5 @10	65kg x5 @6	70kg 5/5 @7	72kg 5/5/5 @7	80kg 5/5/5 @8	87kg 5/5/5 @9
Week #13	**Week #14**	**Week #15**	**Week #16**		
90kg 5/5/5 @9	97kg 5/4/4 @10	92kg 5/5/5 @8.5	102kg5/5/4 @10		
92kg 5/5/5 @9.5	97kg 5/5/4 @10	95kg 5/5/5 @9	102kg5/5/5 @10		
95kg 5/5/5 @10	87kg 5/5/5 @8	97kg 5/5/5 @9.5	105kg4/4/4 @10		
97kg 5/4/3 @10	90kg 5/5/5 @8	100kg5/5/5 @10	Unload / move		

Try to milk as much PBs within phase 1. As it becomes too much strenuous (slow improvement, too much RPE, technique issues, the need for easy days, slow bar speed, etc), move to the next phase. Also, during this phase, find out how much weeks you are able to hit PBs after first stall-out and how many of them. It will provide valuable information in designing mesocycles during later stages.

Phase 2. During this phase you should include new exercise, but do it slowly over time. This will provide easier days and provide new training stimulus to increase strength. After this time athlete is very proficient with basic moves, learns RPE system, know when and how to deaload and how this affect his performance. I would start learning deadlift by now (if RDL is more than 60kg, for example and if they show good form on bottom of the deadlift) and replaced one squat workout for it. You can also include front squat variations and start learning clean/snatch using top-down progression (learn catch, learn shrug&jump from power position, learn jump&catch), and as deadlift moves up, start doing clean/snatch from the floor. Also, you can start moving reps to higher or lower zone for a given goals (relative strength / muscular hypertrophy). Training volume (number of sets) can increase over time slighty. All exercises have equal emphasis in a training session (same or simmilar volume, intensity and effort). Total body split is still prefered method.

Training A	Training B	Training C
Clean Technique	Jerk Technique	Snatch Technique
Squat	Dead Lift	Front Squat
Bench Press	Dips	Military Press
Bulgarian Split squats	Lunges	RDL
Chin-ups	Barbell Rowing	Pull-ups

There is a need for regular deload periods, so the mesocycle (training block) can be arranged using following microcycles. The duration of loading microcycles depends of 'adaptability' of the athlete, or the rate of the imporvement before stalling out.

Week #1	Week #2	Week #3	Week #4	Week #5	Week #6	Week #7
Adjustment	Adjustment	Loading	Loading	Loading	Loading	Recovery
2x5 @7-8	3x5 @8-9	3x5 @9-10	3x5 @9-10	3x5 @9-10	3x5 @9-10	1x5 @7
Learn new exercises	Achive training volume	PBs	PBs	PBs	PBs	Recovery

Try to find out how much loading microcycles you can manage, how much PBs you have achived before stalling and needing an unload. This will give you a basic template for futher phases. Try to milk as much improvement from this phase too.

Phase 3. When introduction of new exercises doesn't seem to prevent stalleness, then playing with loading parameters will (for some time). This involves playing with volume and intensity within loading microcycles. Variations in reps and sets will provide new training stimuli and prevent boredom. All exercise during a training session have equal importance and deserve same training emphasis. The following hypothetical example will show you what I mean, and hopefully you'll get the point.

Week #1	Week #2	Week #3	Week #4	Week #5	Week #6	Week #7
Adjustment	Adjustment	Loading	Loading	Loading	Impact	Recovery
2x6 @7-8	3x6 @8-9	4x6 @9-10	3x5 @9-10	2x4 @9-10	2x5 2x3 @9-10	1x5 @7
Learn new exercises	Achive training volume	PBs	PBs	PBs	PBs	Recovery

THE INTERMEDIATE LIFTER

The main characteristics of the intermediate lifter are the following:

1. Intermediates cannot put an equal emphasis on all exercises in terms of volume, intensity and effort during a single training session, and/or during all training sessions within microcycle. Thus, they need training variety („The varitey lies in the way basic exercises are applied, and not in a bunch of new exercises" – Practical Programming, p.177) in training intensity, volume, effort, frequency and methods used.

2. Intermediates need more directed loading to develop given motor ability

3. Intermediates need greater stress (load - more sets and volume and greater intensity) to cause improvements, but they need more rest (thus the need for week variety) and improvements are slower to come and smaller

4. Work capacity (the ability of the body to recover) improves over time, but in absolute terms. For example, when novice squats 100kg for 3 sets of 5 he is challenged in terms of recovery ability, but once he is able to squat 150kg for 5 sets of 5 months after, doing 100kg for 3 sets of 5 is not challeging in terms of recovery ability, nor it provides great training effect. But, will athlete recover in the same time from 150kg for 5 sets of 5, as he was recovered moths before with 100kg for 3 sets of 5? Maybe yes, meybe no. This is why absolute work capacity (100kg) certainly goes up, and I guess relative work capacity (as percentage of 1RM) goes down, stays the same, or slowly raise, and demand greater recovery time

5. Intermediates can hit PBs from week to week in general

6. Intermediates need regular easier days within microcycle, and this comes together with number one characteristic

7. Intermediates need regular and more longer unload period compared to novices

Compared to novices where every training effects 'spills-over' to numerous motor abilities, intermediates need more directed training load to develop a given motor ability/quality.
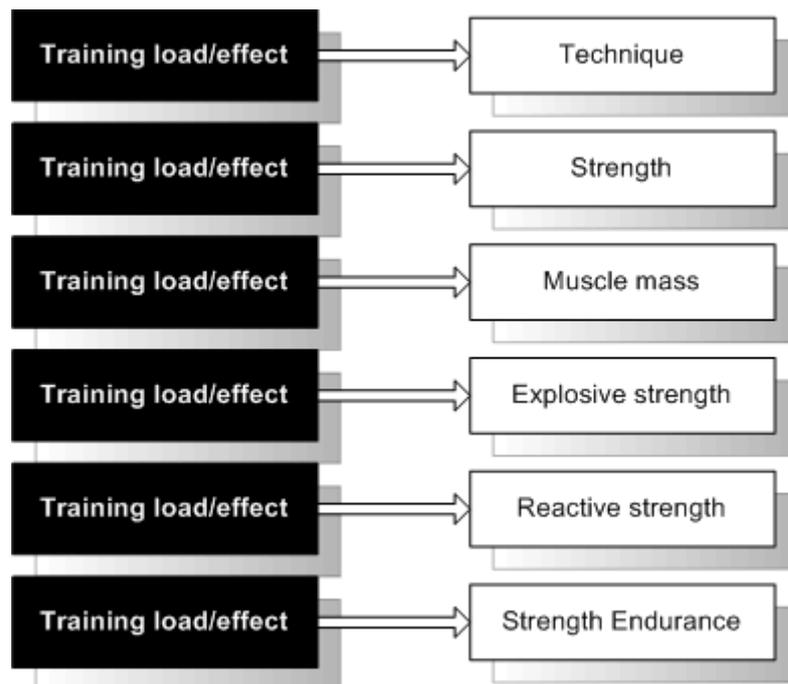
Basically, intermediates are ready for a true complex-parallel (concurrent) approach, if the goal of strength training is the development of numerous motor abilities/tasks simultaneously. Again, we must differ between strength training as a training system's component for non-strength sports, and strength training for strength sports. For non-strength sports you can use complex-parallel approach for strength training (development of explosive strength, strength and muscle mass), or you can arrange strength training in a different fascion to fill your athletic needs. Anyway, the simmilarities in planning of the strength training are still large, and that is why non-strength athletes can learn great info from intermediate strength planning.

Please note that I am NOT trying to say that intermediates must do a complex-parallel approach. I am just trying to say that complex-parallel approach is still a great solution if they need to work on more motor abilities, before they need more advanced solutions in advanced stage. There is certainly a posibility where you can/must use more serial approach to develop motor abilities.

To deal with characteristics of the intermediate lifter and develop multiple abilities/qualities simulatenously (concurrently) one may choose multiple solutions. I have talked about Wide Pyramids, DUP (Daily Undulating Periodization) and Priority lifts in Concurrent Strategies in Strength Training.

Basically, since intermediates cannot put equal emphasis (in terms of volume, intensity and effort) on all exercises during a single training sessions, priorities must be set. They need exercise emphasis. Also, since they cannot hit PBs during every training session for a given movement, you simply cannot expect doing 3x/wk squats and hiting PBs every time. You would need more easier days and load alternations. One solution is Texas method. I have talked about Volume/Intensity phases and their purpose as different ways to increase strength. Well, in Texas method they are not phases, but rather workouts. Take an example for the squats:

Volume	Recovery	Intensity
5x5 @8-9RPE	3x5 @6-7 RPE	1x5 @9-10RPE (PB)

Note that you can arrange exercises in Volume/Recovery/Intensity fascion, or you can arrange training sessions. For example

Training Sessions		
Volume	**Recovery**	**Intensity**
Squat 5x5 @8-9RPE	Squat 3x5 @6-7 RPE	Squat 1x5 @9-10RPE (PB)
Bench Press 5x5 @8-9RPE	Bench Press 3x5 @6-7 RPE	Bench Press 1x5 @9-10RPE (PB)
Pendlay Row 5x5 @8-9RPE	Pendlay Row 3x5 @6-7 RPE	Pendlay Row 1x5 @9-10RPE (PB)

Exercises		
Squat	**Pendlay**	**Bench Press**
Squat 1x5 @9-10RPE (PB)	Pendlay Row 1x5 @9-10RPE (PB)	Bench Press 1x5 @9-10RPE (PB)
Bench Press 5x5 @8-9RPE	Squat 5x5 @8-9RPE	Pendlay Row 5x5 @8-9RPE
Pendlay Row 3x5 @6-7 RPE	Bench Press 3x5 @6-7 RPE	Squat 3x5 @6-7 RPE

This example can be used for more serial/sequential development of abilities, or can be used as an idea of load alternation in later phases of the intermediate phases.

Another solution would be Upper-Lower split, or some other split based on exercise importance. Upper-lower split allows you to increase training load, but reduces the training frequency. For example, instead of doing squats 3x/wk as in novice phase, utilizing upper-lower split you would do them 1.5x/wk (first week 1x, second week 2x). This will allow you to use greater load and have greater recovery time. Upper-Lower split is actually very good solution, and we will come back to it later.

Priority lifts method, according to exercise importance, classify every exercise into separate groups. The groups can be sport-oriented or movement-pattern oriented. For example, instead of doing Volume/Recovery/Intensity for squats you could utilize secondary and auxiliary exercises for the squat movement on every training session.

Primary	**Secondary**	**Auxiliary**
Squats 3x5 @9-10	Front Squats 3x5 @8-9	Split Squat 3x5 @7-8

If you establish different repetition brackets for every exercise group, you can easility utilize complex-parallel approach. More on this in Concurrent Strategies in Strength Training.

Primary (Maximum Strength)	**Secondary (Speed)**	**Auxiliary (Hypertrophy)**
Squats 5x2 @9-10	Box Squats DE 8x2 @6-7	Split Squat 3x8-12 @8-9

To provide an example of planning of strength training for intermediate athletes, I will assume that they are pursuing development of maximum strength, functional hypertrophy and explosive strength (using Olympic lifts in this example instead of DE squats and presses), at the same time (concurrent approach). One can also utilize more serial approaches, especially with non-strength athletes, but this would depend on Second Zoom Level, athlete level, sport, phase, etc. For sure, there are numerous solutions, and I am only trying to practically utilize the theoretical concepts we have talked about in concurrent scheme.

I strongly suggest taking a look at Concurrent Strategies in Strength Training article, because I will use Priority lifts method as an example of concurrent planning for intermediate lifter. In the mentioned article there is thorough description of this method. Another highly suggested book is Practical Programming, from which I have extracted most of the planning principles of strength training.

Phase 1. During this phase, athlete or coach decides whether he or she wants to utilize Total Body Split or Upper/Lower, or some other form of split system based on exercise importance, or training schedule (for non-strength athletes). There are pro's and con's to all of them, and there may be a situation where you may/must utilize numerous split solutions (for example in Fatigue/Frequency Based Cycles aimed at work capacity development). Good intermediate system is Joe Kenn' Tier System, in which coach Kenn utilize Total Body Split and presents both concurrent (modified WSBB method) and more sequential

approach, and also presents numerous mesocycle solutions. Coach's Kenn philosophy has influenced me in great degree. Another exanole of Upper/Lower Split utilizing concurrent approach is Joe De-Franco's WS4SB system. Depending on the context you may select Total or Upper/Lower system, or something in between.

For the sole purpose of this article, let's design Upper/Lower Split for intermediate athlete with concurrent goals, taking into account characteristics of intermediate lifters.

Training A (Monday)	Training B (Tuesday)	Training C (Thursday)	Training D (Friday)
A. Clean (DE)	A. Bench Press (ME)	A. Snatch (DE)	A. Press (ME)
B. Squat (ME)	B1. DB Bench Press (RE)	B. DeadLift (ME)	B1. DB Press (RE)
C. RDL (RE)	B2. Pendlay Row (RE)	C. Lunge (RE)	B2. Pull-Ups (RE)
D. Abs	C. Beach Work (RE)	D. Abs	C. Beach Work (RE)

Upper and Lower body may be rotated, if the heavy lower body workout negativelly influences upper body ME work. The design of mesocycle may be something like this:

Protocol	Week #1	Week #2	Week #3	Week #4	Week #5	Week #6	Week #7
	Adjustment	Adjustment	Loading	Loading	Loading	Loading	Recovery
DE (Oly)	2x2 @7-8	3x2 @8-9	4x2 @9-10	4x2 @9-10	4x2 @9-10	4x2 @9-10	2x2 @7-8
ME	3x2 @8-9	5x2 @8-9	6x2 @9-10	6x2 @9-10	6x2 @9-10	6x2 @9-10	3x2 @7-8
RE	2x6-8 @8-9	3x6-8 @8-9	4x6-8 @9-10	4x6-8 @9-10	4x6-8 @9-10	4x6-8 @9-10	2x6-8 @7-8
	Learn new exercises	Achive training volume	PBs	PBs	PBs	PBs	Recovery

If one wants to do only squats instead of deadlifts, or only bench press instead of press, then the first workout may be Intensity (i.e. 3x2 @9-10) and the second can be Volume workout (i.e. 6x3 @8-9), utilizing ideas from Texas method. Anyway, there should be a variations used, if the same movement is repeated more than once within a microcycle, with the same goal (maximal strength, hypetrophy, explosive strength). Keep the intensity high (or vary it slightly), while changing the quality of work done, like number of reps, sets, speed. This is a critical factor to avoid premature staleness and psychological boredom. Higher intensity work must be varied over the week, if it is going to be used for longer periods of time.

The characteristic of Phase 1 of intermediate athlete is that he or she cannot put equal emphasis on every exercise in a workout (or all workouts), thus there need to be exercise emphasis involved (Priority Lifts method, or volume/intensity/effort combos). Another characteristic of Phase 1 is that there is no need for set/rep alternations during the mesocycle. If one wishes to use auto-regulary training, be my guest, just keep it simple. There is no need for Fatigue Percents, use simple Fatigue Stop method.

If there is a need to do both Bench Press/Press and Squat/Deadlift in a single workout, one may utilize Intensity loading for the first exercise, and Volume or Recovery loading for the second. Here is an example.

Training A (Monday)	Training B (Tuesday)	Training C (Thursday)	Training D (Friday)
A. Dead Lift (Intensity)	A. Bench Press (Intensity)	A. Squat (Intensity)	A. Press (Intensity)
B. Squat (Volume)	B. Press (Volume)	B. DeadLift (Recovery)	B. Bench Press (Volume)
C. RDL (RE)	C1. DB Bench Press (RE)	C. Lunge (RE)	C2.. DB Press (RE)
D. Abs	C2. Pendlay Row (RE)	D. Abs	C1. Pull-Ups (RE)

Heavy, limit-level deadlift are very stressful, making Volume protocol (sets across) a bad choice, that's why I used Recovery protocol instead, just to keep the deadlift 'groove' in place. Anyway, this depends on the work capacity of the lifter and training frequency. Volume workout for deadlift may be used if frequency is three trainings per week instead of four for example, but again, it depends.

Simmilar approach can be used with Olympic lifts if done more frequently. The <u>key</u> is volume/intensity/effort alternations, or variations of higher intensity work in terms of intensity used, effort expressed and volume done.

Phase 2. Compared to Phase 1, in Phase 2, athlete need more mesocycle variations. Variations can be implemented by utilizing (1) **different reps/set during mesocycle**, (2) **volume/intensity microcycles** and (3) **load alternations**. There may be more of solutions, but I am too lazy to find them. Use this just as an example.

As an example of **reps/set alternations** within mesocycle, we can utilize the following hypothetical solution:

Protocol	Week #1	Week #2	Week #3	Week #4	Week #5
	Adjustment	Loading	Loading	Loading	Recovery
DE (Oly)	3x2 @8-9	4x2 @9-10	2,1,2,1	4x1 @9-10	2x1 @7-8
ME	3x3 @8-9	5x3 @9-10	5,4,3,2,1	6x1 @9-10	4x1 @7-8
RE	3x6 @8-9	4x6 @9-10	4x8 @9-10	4x6 @9-10	2x6 @7-8
	Achive training volume	PBs	PBs	PBs	Recovery

Alternations in reps/set can provide variety and prevent boredom. Another solution is to devise **volume/intensity microcycles**.

Protocol	Week #1	Week #2	Week #3	Week #4	Week #5	Week #6
	Adjustment	Loading (Volume)	Loading (Intensity)	Loading (Volume)	Loading (Intensity)	Recovery
DE (Oly)	3x2 @8-9	6x2 @8-9	3x2 @9-10	6x1 @8-9	3x1 @9-10	2x1 @7-8
ME	3x3 @8-9	6x3 @8-9	3x3 @9-10	6x2 @8-9	3x2 @9-10	2x1 @7-8
RE	3x6 @8-9	4x8 @8-9	2x8 @9-10	4x6 @8-9	2x6 @9-10	2x6 @7-8
	Achive training volume		PBs		PBs	Recovery

More advanced mesocycle structure that utilize volume/intensity microcycles involves alternations of volume/intensity loading for a given motor ability/quality alternativelly. Take an example:

Protocol	Week #1	Week #2	Week #3	Week #4	Week #5	Week #6
	Adjustment	Loading	Loading	Loading	Loading	Recovery
DE (Oly)	3x2 @8-9	6x2 @8-9	3x2 @9-10	6x1 @8-9	3x1 @9-10	2x1 @7-8
ME	3x3 @8-9	3x3 @9-10	6x3 @8-9	3x2@9-10	6x2 @8-9	2x1 @7-8
RE	3x6 @8-9	4x8 @8-9	2x8 @9-10	4x6 @8-9	2x6 @9-10	2x6 @7-8
	Achive training volume	PBs	PBs	PBs	PBs	Recovery

In all mentioned examples, auto-regulatory training may be utilized, with Fatigue Stops or same Fatigue Percents (choose one load/stress level and stick to it over a whole mesocycle). Another approach that may be utilized is different microstructure organization, or using **microcycles of different loading/stress level**.

Protocol	Week #1	Week #2	Week #3	Week #4	Week #5	Week #6
	Adjustment	Loading	Shock	Recovery	Loading	Recovery
DE (Oly)	2x2 @8-9	4x2 @9-10	6x1 @10	2x2 @7-8	4x2 @9-10	2x2 @7-8
ME	4x2 @8-9	6x2 @9-10	8x1 @10	2x2 @7-8	6x2 @9-10	2x2 @7-8
RE	3x6-8 @8-9	4x6-8 @9-10	5x6 @10	2x6 @7-8	4x6-8 @9-10	2x6 @7-8

	Achive training volume	PBs	PBs / Shock	Recovery	PBs	Recovery

Different Volume/Intensity microcycle combos can be utilized to provide mesocycle variety. You can also play with frequency of training within microcycle to provide training variety and stimuli. When using auto-regulatory training, one can utilize different Fatigue Percents (FP) to induce different (microcycle) load. For example:

Protocol	Week #1	Week #2	Week #3	Week #4	Week #5	Week #6
	Adjustment	Loading	Shock	Recovery	Loading	Recovery
DE (Oly)	2s @8-9 w/3% FP	2s @9-10 w/5% FP	1s @10 w/10% FP	2s @7-8 w/0% FP	2s @9-10 w/5% FP	2s @7-8 w/0% FP
ME	2s @8-9 w/3% FP	2s @9-10 w/5% FP	1s @10 w/10% FP	2s @7-8 w/0% FP	2s @9-10 w/5% FP	2s @7-8 w/0% FP
RE	6-8s @8-9 w/3% FP	6-8s @9-10 w/5% FP	6s @10 w/5% FP	6-8s @7-8 w/0% FP	6-8s @9-10 w/5% FP	6-8s @7-8 w/0% FP
	Achive training volume	PBs	PBs / Shock	Recovery	PBs	Recovery

The most advanced or complex method for intermediates would involve a combination of volume/intensity or rep/set alternations with different load/stress level microcycles, utilizing autoregulatory training using Fatigue Percents or using ordinary pre-set number of sets. Solutions are numerous if you understand the principles behind it.

When introducing new training days, they should be medium in volume and medium in effort (@7-8 RPE) and slowly the effort raises over weeks or moths. Most of the athletes in non-strength sports will find four strength training days a maxium allowable anyway. But more advanced weightlifters or powerlifters with high work capacity may utilize more frequent training schedule. At some level, the ability to increase training volume to the maximum tolerable level may determine the ultimate success of the athlete. Higher total week volume may approve for more training days, but before more volume is added, coach or athlete himself must analyze the cause of plateau and make sure it is volume-related (not enough volume) before adding more, slowly gauged volume of training.

Utilization of Frequency/Fatigue Cycles can also be introduced. The Frequency/Fatigue Cycles are aimed at Work Capacity development. Individual Frequency/Fatigue cycle may last couple of mesocycles.

THE ADVANCED LIFTER

Basic characteristics of the advanced athlete are the following:

1. They cannot develop everything at once. They need to prioritize the training goals or they will suffer from overtraining and limited progress

2. The cumulative/delayed training effects of series of workouts becomes more and more important. PBs are achived every couple of weeks or months.

3. Training must be organized into longer periods of time, and those periods progress from higher volume and lower intensity toward lower volume and higher intensity

4. Sometimes the characteristic number three doesn't allways apply, especially if the aim of training block is to produce acute over-reaching and later usage of delayed training effects

Compared to intermediate athletes, advanced athletes need greater training load to futher improve a given motor ability/characteristic, but cannot improve more than couple of them at a givem moment, because total training load would be too much for their work capacity. This is why complex-parallel approach is very difficult to succesfully utilize, except eventually at the first phase of advanced level.
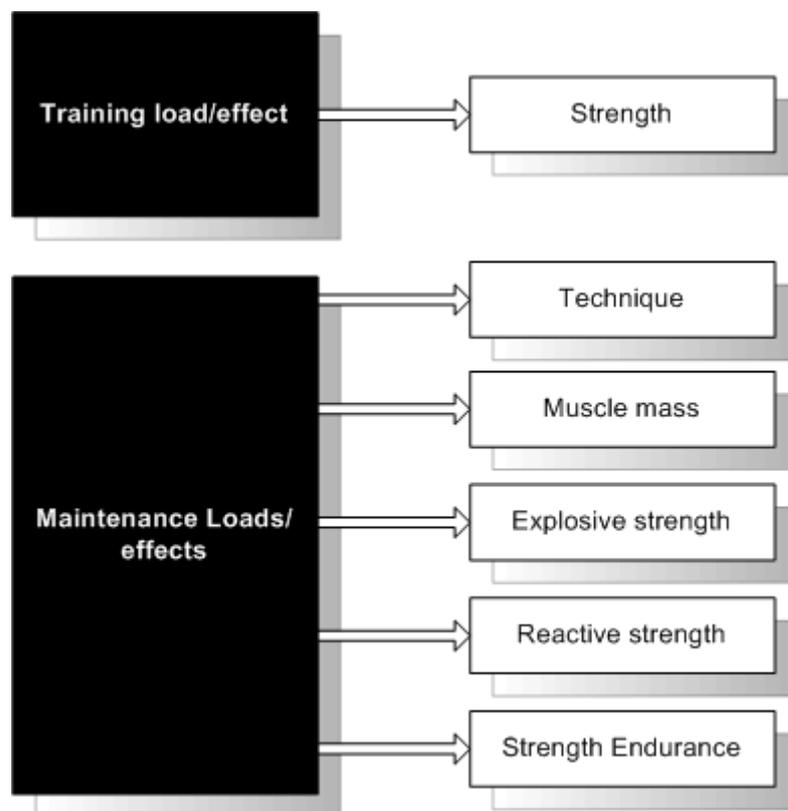
In the mentioned concurrent examples for intermediate level, athletes seeks to improve everything at once: Olympic lifts, squat, deadlifts, benches, chins, presses and rows, while also pounding secondary and auxiliary movements for muscle mass. This will work for a decent ammount of time (if the week structure is optimally organized based on athletes adaptability and work capacity, along with other factors), but after some time you will soon find out that you simply cannot do everything at once. Trying to increase clean performance will leave you fatigued for squats. Squats will leave you fatigued for presses, etc, etc. This is the time when you need to prioritize your training, you need to focus on couple of things while maintaining others (unless you utilize block approach where you are using training residuals instead of maintenance loads). The usage of block approach or emphasis approach is now a neccesity.

In my humble opinion there are three things that may direct 'prioritization' in strength training:

    1. Movement pattern. One may decide to pursuit Olympic lifts (or Clean, or Snatch, or Jerk), one may decide to concentrate on improving his bench press, or one may decide to concentrate on his deltoids development. In bodybuilding world this is called 'muscle specialization'.

    2. Motor ability/quality. One may decide to pursuit relative strength and maintain his hypertrophy, or one may maintain fat levels and strength while aiming for maximal muscular hypertrophy, etc, etc.

    3. A combination. One may decide to pursuit his speed in his bench press and work on his sticking point, while also maintaining strength and hypertrophy in his pecs and the rest of his body.

To provide couple of examples of planning of strength training for advanced athletes, I devised couple of phases. Please note that there can be greater number of phase depending on the sport and the level of the athlete, so keep in mind that these are devised only for the example purpose.

Phase 1. The first phase is basically same concurrent approach as with intermediates, yet it is organized to take into equiation the second and the third characteristic of the advanced lifter. In the first phase, advanced athletes are still able to cope with concurrent approach, but their training need to be organized into longer periods of time, and those periods progress from higher volume and lower intensity toward lower volume and higher intensity. There could be numerous solutions to this, for example (a) linear periodization that utilize 'smooth' volume/intensity transition or (b) volume/intensity blocks that utilize 'abrupt' volume/intensity transition. I will expand more on the second example.

Phase 1 can be organized into longer duration volume/intensity blocks, that last from 2-3 weeks to a longer duration (whole mesocycle), depending on the level of the lifter and his work capitity.

Protocol	Volume Phase			Intensity Phase		
	Week #1	Week #2	Week #3	Week #4	Week #5	Week #6
DE (Oly)	6x2 @8-9	6x2 @8-9	6x2 @9-10	3x1 @8-9	3x1 @9-10	3x1 @9-10
ME	6x3 @8-9	6x3 @8-9	6x3 @9-10	3x2@8-9	3x2@9-10	3x2@9-10
RE	4x8 @8-9	4x8 @8-9	4x8 @9-10	2x6 @8-9	2x6 @9-10	2x6 @9-10
			PBs			PBs

The Volume Phase can include higher workout-frequency, greater number of sets within workouts to induce greater total weekly training, but the relative intensity and effort should be less. In the intensity Phase, the volume of training goes down (total weekly and per training session) to allow fatigue to dissipate and strength to realize. After the Volume/Intensity Phases one or two microcycles should be utilized to provide recovery.

With advanced stages of Phase 1, microcycle variations can and should be utilized. The ideas presented in Phase 2 of intermediate lifter. They include (1) different reps/set, and (2) load alternations during volume/intensity phases. This should prevent boredom and staleness.

When this organization starts to induce issues with recovery, one simple solution can be utilized before utilizing more serial approaches. To reduce total training volume, one can organize Volume/Intensity Phases per motor ability/quality instead of using general phases as before.

Protocol	Week #1	Week #2	Week #3	Week #4	Week #5	Week #6
DE (Oly)	3x1 @8-9	3x1 @9-10	3x1 @9-10	6x2 @8-9	6x2 @8-9	6x2 @9-10
ME	6x3 @8-9	6x3 @8-9	6x3 @9-10	3x2@8-9	3x2@9-10	3x2@9-10
RE	2x6 @8-9	2x6 @9-10	2x6 @9-10	4x8 @8-9	4x8 @8-9	4x8 @9-10
			PBs			PBs

With the example above, one can see that the emphasis (using different Volume/Intensity Phases) is used for a given motor ability/quality over 3 wks period. This start to look more and more to more serial approach of developing motor abilities/qualities. As with previous example, one can utilize (1) different reps/set, and (2) load alternations during volume/intensity phases to prevent boredom and staleness in later stages of Phase 1.

Phase 2. In the Phase 2 of the advanced lifter, one must start to use more serial approaches to develop motor abilities/qualities. Depending on the context, goals and athletes (and coaches preferences), one may utilize more block-like or emphasis-like approach. To provide some examples, I will utilize more emphasis-like approach.

Before going on futher, one must devise loading parameters in the form of **loading** and **retaining**. Please note that 'emphasis' is certainly a load issues, thus one may emphasise a development of a given motor ability/quality by utilizing different training frequency, intensity, volume. There could be a lot of solution, and I will pick one that Lyle McDonald devised in his <u>Periodization for Bodybuilders</u> series of articles.

Lyle presented presented a loading guidelines for loading and maintaining/retaining different motor abilties/qualities.

Modified Lyle McDonald's Loading Guidelines		
Type	Loading / Developing	Maintaining / Retaining
Maximum Strength	6-10 sets	2-3 sets
Myofibrilar Hypertrophy	2-8 sets	1-2 sets
Hypertrophy	3-6 sets	1-2 sets
Sarcoplasmatic Hypertrophy / Strength Endurance	1-2 sets	1 set

As I have noted earlier, one can emphasise (1) movement pattern, (2) motor ability/quality or (3) a combination. The more advanced the athlete the more precise the emphasis, for example one may devise whole training block to work on lockout strength in bench press, or grip work, or even sticking point in squat.

As an example for **movement pattern emphasis**, one may decide to utilize a given approach

Example for advanced powerlifter			
Block #1	Block #1	Block #2	Block #3
General Bulking	Squat	Bench Press	DeadLift
- Increasing whole body muscle mass and GPP - Maintaining ME qualities in bench, squat and DL with maintenance loads	- Aiming at increasing ME, DE, RE in squat - Maintaining strength in bench and deadlift - Maintaining muscle mass and GPP	- Aiming at increasing ME, DE, RE in bench press - Maintaining strength in squat and deadlift - Maintaining muscle mass and GPP	- Aiming at increasing ME, DE, RE in deadlift - Maintaining strength in squat and bench press - Maintaining muscle mass and GPP

As an example for motor ability/quality emphasis one may decide to utilize approach simmilar to this one:

Emphasis Method			
	Block #1	Block #2	Block #3
Emphasis	Muscular Hypertrophy (RE)	Maximal Strength (ME)	Explosive Strength (DE)
Maintenance	Maximal Strength (ME)	Muscular Hypertrophy (RE)	Maximal Strength (ME)
Maintenance	Explosive Strength (DE)	Explosive Strength (DE)	Muscular Hypertrophy (RE)

A combination of the two would be most advanced and used with the most advanced lifters. For example in Bench press 'period' one may utilize a specific block aimed at muscle mass and specific block aimed at maximum strength taking stregnth and weaknesses into equation

After picking an approach and working on it a decent ammount of time, one can progress over time by using different microcycle variations covered in Phase 2 of intermediate lifter: (1) different reps/set during mesocycle, (2) volume/intensity microcycles and (3) load alternations. This should present a next step in training complexity and should prevent boredom and staleness.

After microcycle variations within emphasis block stops to prevent boredom and staleness, one may utilize Volume/Intensity phases within emphasis blocks.

Block #1		Block #2		Block #3	
Muscular Hypertrophy or Squat Cycle		**Maximum Strength or Bench Press Cycle**		**Explosive Strength or Deadlift Cycle**	
Volume Phase	Intensity Phase	Volume Phase	Intensity Phase	Volume Phase	Intensity Phase

If you have read this article carefully, you will notice that with advanced lifters in Phase 2, I utilized more serial approach in Second Zoom Level. As they start to stagnate with Second Zoom Level, I started to utilize more complex load progressions in Third Zoom Level, by uzing microcycle variations, later on Volume/Intensity Phases. To provide even more complexity to prevent boredom and staleness, one may utilize different microcycle progressions withing Volume/Intensity Phases.

Up till now I utilized first three characteristics of advanced lifters. One can experiment with acute overreaching approach, by utilizing very concentrated load by using high intensity and high volume at the same time for about two or three weeks, and later unloading to allow fatigue to dissipate and strength increase to emerge. One approach that utilize this approach is Hormonal Fluctuation Model and can be found in Practical Programming book.

Hopefully you are able to utilize ideas from this article in strength training practice and maybe in some other sports practices as well.

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