Overloading Without Overtraining

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The Overload Principle is one of the basic tenets of a successful strength training program. Basically, it calls for increased intensity, duration, and/or workload volume over a designated period.

As vital progressive overload is, however, it can prove to be a double-edged sword.

Without proper management, haphazard overloading in the absence of adequate recovery can result in a very real physical and psychological state known as overtraining.

The medical literature tells us that overloading the neuromuscular system via strength training, running, and skill-specific tasks is necessary to push through homeostasis (i.e., the state of normalcy or equilibrium) to improve performance capacity. Only through *supercompensation* -- which amounts to working hard, and then enabling the body to recover and come back even stronger – can athletes reach the heights of their physical potential.

Simply put, the body must be gradually and progressively edged out of its physical "comfort zone" with a training stimulus, and then given the opportunity to grow before a new stimulus is initiated.

The caveat to this axiom is that too much hard training without the concurrent recovery allotment can actually lead to diminishing returns and poor performance.

Let's take a closer look at the overtraining syndrome and offer some suggestions for avoiding it.

Understanding the Overtraining Syndrome

Numerous clinical trials have been performed on athletes believed to be in an overtraining state. Some of the findings include decreased performance in exercise testing, altered immune status, increased cortisol (the body's "stress hormone") levels, and decreased testosterone levels (the body's anabolic, or muscle building, hormone) . Several psychological markers – including a depressed mood state – have also been identified.

Not surprisingly, the most common symptom is fatigue. This is not the acute fatigue athletes experience as a result of several consecutive hard workouts, but rather a chronic, overwhelming fatigue that affects not only performance, but also daily living activities.

From a medical perspective, the overtraining syndrome is classified as a "neuro-endocrine" disorder – meaning that there has been an interruption of the fine balance in the interaction between the nervous and hormonal systems.

More specifically, it is the *autonomic* nervous system -- which innervates and has spontaneous control over involuntary bodily functions encompassing glands, smooth muscle tissue, blood vessels, and the heart – that is most profoundly affected. This accounts for the changes in resting and exercising heart rate, possible hormonal imbalances, and chronic muscle fatigue and/or soreness.

There appear to be some physiological markers that differ between power athletes and endurance athletes, but chronic fatigue is the universal indication.

Unfortunately, there is no single test that will confirm that overtraining has reared its ugly head. However, when an athlete manifests several overtraining symptoms (Table 1),

steps should be taken to exclude an underlying illness, followed by a well-developed game plan to stem its proliferation.

Obviously, rest is the most important and vital treatment for overtraining syndrome. The duration and type of rest (i.e., complete or slightly active) should be determined by the medical and sportsmedicine staffs.

This rest period must be coupled with a nutritional strategy that introduces the appropriate amounts of macronutrients (protein, carbohydrates, and fats) and micronutrients (vitamins and minerals) for tissue recovery and energy replacement. This also must be tailored to the athlete's individual needs and special considerations by a support staff of medical and nutritional professionals.

Checks and Balances

Prevention is the best way to deal with overtraining. Remember, it is primarily caused by long periods of hard physical training with little consideration given to rest, recovery, and growth.

Therefore, variations in training parameters should plugged into the yearly training calendar that allow for physical progression with the exponential respite periods.

Here are some considerations and suggestions for keeping your athletes progressing at optimal levels without hitting the wall:

Control training/practice frequency **–** This is the first, and arguably the most important, factor to consider when scripting the training calendar. Time off – *completely* off – must be as discreetly placed as the lifting, running, scrimmages, games, etc, in the overall schematic. A minimum of one day off for every 6-7 workdays will usually suffice, but more may be necessary. The longer you've been training or the deeper into the season

you get, the more important the roles of rest and recovery in steadily improving performance. Properly placed days of absolute physical and mental rest, recovery, and nutritional support will help your athletes "fill their tanks" and return with a renewed vigor and enthusiasm.

Many coaches – including myself – often fall into the "more is better" trap, with anything less mistakenly construed as poor work habits. We all must understand that there is hard, productive, effective, and efficient work – and there is the futile attempt to squeeze blood out of a turnip.

Strive for the former, not the latter.

If you've been pushing your kids hard for a lengthy period of time with noticeable improvements in performance and mental aptitude, and then suddenly it seems as though the bottom collapses and your practices resemble a scene from the Night of the Living Dead, it's time for a break!

Proper planning is the key to averting that situation.

Manipulate intensity, volume, frequency, and duration in the weight room: Please check last month's PowerLine, as we offered some suggestions for keeping the strength workouts challenging and your athletes fresh.

As a reminder, the two most important and manageable variables are volume and frequency. Both must be reduced significantly as the season approaches and more physical stresses are placed on the athletes. Doing this allows you to keep the intensity fairly high.

***Manipulate training/practice intensity* –** Last month, we discussed variation strategies in strength training, their importance in overcoming plateaus, and keeping your athletes

fresh and motivated. The same holds true for any of the multitude of training procedures and practice modes. This is especially true for the in-season period.

A weekly plan for interspersing hard, medium, and lighter training sessions and practices will allow the body's systems to acclimate and make the proper adjustments. For sports that compete once a week, such as football, it would be wise to hold no more than two consecutive "hard" practices, followed by medium and/or lighter intensity affairs. The day before competition should amount to nothing more than a "walk-thru," with most of the emphasis on the cognitive aspects of the game preparation.

The schedule might look like this:

Monday – Medium intensity practice, minimal full-contact periods, with the emphasis on corrections and special teams. Good day for a stout lifting session (early in the day) and some conditioning (post-practice).

Tuesday – High intensity practice, heaviest hitting day. Emphasis is on individual fundamentals and group work. Goal line offense/defense period. Lighter post-practice conditioning day.

Wednesday – High/medium intensity day. Emphasis is on group and team work. Lower volume lifting day, as well.

Thursday – Medium/light intensity day, minimal full-contact periods. Special teams and special situations (down and distance game plan, two minute drill, etc.).

Friday – Crisp walk-thru, assignment emphasis. Younger kids who do not play might get in an additional low volume lift.

Saturday – Game

Sunday – Rest day. Tape review, corrections, and scouting report.

For sports such as basketball that usually have two games per week, adjustments must be made so that the truly hard practices are as far removed from game day as possible. The practice and lifting schedule might look like this:

Sunday – High intensity practice, lift (lower body emphasis)

Monday – Medium/light intensity practice.

Tuesday – Game.

Wednesday – Medium intensity practice, lift (upper body emphasis).

Thursday – High intensity practice.

Friday – Light intensity practice – mostly scripted offensive/defense situations.

Saturday – Game.

Sunday – Rest day. At most, maybe a light "shoot-around", video/ scouting report session.

As we have recommended before, you should gauge the amount and intensity of any post-practice conditioning procedures against the duration and quality of the practice session. Remember, if you just finished a sloppy, low-tempo, lethargic two hour practice, don't expect to make amends with a 10 minute post-practice conditioning session. Regardless of the sport, the nexus of your conditioning must be the tempo, quality, and intensity of the main body of the practice sessions.

In most cases, if practice is conducted with this objective in mind, additional conditioning procedures can be kept to a minimum, thus preventing deeper cuts into your athletes' energy reserves.

Note: An important point here is that the terms "medium" and "light' are not necessarily synonymous with "easy." A practice can be run full speed, but administered in a manner that reduces certain physical stresses on the athletes.

Examples:

1. Separate hard practice periods with longer teaching sessions...
2. Reduce the number of full contact periods (football).
3. Increase the number of breaks in the practice.
4. Keep the intensity high, but the volume of reps medium to low.
5. Reduce practice duration.

   An effective and highly efficient strategy for garnering quality conditioning and avoiding the snare of overtraining is to keep the intensity relatively high, while systematically reducing the duration and/or volume of the sessions and inserting adequate relief and recovery periods. This holds true for practices, lifting, and many other training procedures.

Apply a sound nutritional strategy – Everyone is familiar with the term *metabolism,* and we generally think of it as how our bodies utilize the foods we eat. Actually, metabolism encompasses the entire process of the building-up and breakdown of energy and tissues in the body. Metabolism can be described in three basic stages:

Catabolism – The stage where energy is depleted and tissue damage is present as a result of exercise.

Anabolism – The stage where energy is replenished and damaged tissues are being repaired via rest and appropriate diet.

Equilibrium – The fully recovered stage in which energy is in full supply and structural tissues are not being damaged or repaired.

Sound nutrition can help athletes get as close as possible to a state of equilibrium. It begins with restoring muscle glycogen immediately after exercise. This involves ingesting .5-.7 grams per pound of body weight of relatively high glycemic index carbohydrates within 30 minutes of practices/workouts. Liquid sources (e.g., Gatorade and other sports drinks) are excellent choices for immediate consumption, and the process should be gradual and ongoing for two to six hours post-event/exercise.

Protein is also vital to maintain muscle protein balance (MPB). MPB is the difference of protein synthesis minus protein breakdown. While we do not know the optimal amount of protein necessary for adequate protein synthesis in everyone, there seems to be a general consensus that .7-.9 grams of quality protein per pound of body weight daily is required for most highly active athletes.

Many registered dieticians recommend a combination of carbs and protein for the post event/practice meal, with the protein constituting at least 20-30 grams.

There are also a host of vitamins and minerals that are abundant in fruits, vegetables, and whole grain breads, cereals, and pastas that will boost the recovery and energy replenishment processes.

Stay hydrated **–**Water is nature's best and most required supplement. Even a moderate level (as low as 2%) of dehydration can lead to big problems. Coach must demand that their athletes drink plenty of fluids – either water or the carbohydrate/electrolyte laden sports drinks – on a consistent basis. Cool drinks (10-15 degrees C) will promote greater

intake, and sports drinks are usually preferred due to their palatability. Sports drinks also offer an edge over water in the energy replacement category.

Get adequate sleep: We are learning that young people in general need at least eight hours of quality sleep each night. For athletes, it may be as high as ten. Too many athletes are trying to get by on six or seven hours a night, which amounts to burning the candle at both ends with an impending implosion.

Final Rep

"Go hard, or go home" is the mantra for many coaches and athletes, and the meaning is well taken. We all want tough, hard-working players who understand what it takes to be successful.

Just remember that, in the end, "train hard, but train *smart"* has a more important impact.

Table 1

Possible Symptoms of Overtraining

- Usual workouts feel much more difficult.
- Fatigue sets in much earlier during practices/workout.
- Faster heart rate with less effort.
- Noticeable drop in strength levels.
- Persistent, overwhelming fatigue.
- Persistent, deep muscle soreness.
- Loss of appetite.
- Increase in overuse injuries.
- Frequent colds and other infections indicating a depressed immune system.
- Feelings and signs of depression.
- Increased sensitivity to emotional stress.
- Lack of motivation.
- Difficulty sleeping.
- Unusual drop in body weight.

Note: It is important to rule out an illness or other physical/emotional conditions when one or more of these symptoms surface.