Micro-Dosing with Speed and Tempo Sessions for Performance Gains and Injury Prevention

Derek M. Hansen
@DerekMHansen
www.StrengthPowerSpeed.com

I first heard of the term "micro-dosing" from an interview I read a number of years ago featuring infamous supplement developer, Victor Conte, when he was detailing the illicit tactics of professional athletes attempting to circumvent the testing protocols of drug testers. He discussed the strategic use of exogenous testosterone by athletes to sustain elevated testosterone levels just under the allowable testosterone-to-epitestosterone ratio of 4 to 1. In the average human being, the production of testosterone and epitestosterone is typically found to be at a ratio of 1 to 1, although there have been documented genetic anomalies. If an athlete is found to have a testosterone to epitestosterone ratio of 4:1 or greater, it is considered suspicious and followed by a more advanced Carbon Isotope Ratio (CIR) test to determine if the source of the excess testosterone is exogenous (plant derived testosterone) or endogenous. Thus, it has been suggested by Conte that many athletes are "micro-dosing" to accrue the performance enhancing benefits of exogenous testosterone without going over the 4:1 ratio established by the World Anti-Doping Agency and testing positive.

It is interesting to examine the concept of micro-dosing in the context of prescribing exercise. In most cases, volumes of work prescribed in training sessions and sport-specific practice are not determined by physiological limitations or optimal loading for adaptation. Rather, the total amount of work is determined by more mundane constraints such as facility availability, strategic goals, practice duration conventions or CBA/NCAA mandated rules for limits on practice. It can be assumed that, in many cases, too much work is being given to the athletes because of the nature of practice scheduling and, at the very least, tradition. The average practice duration for all sports seems to be two hours, but no one can tell me why this length of time has been identified as optimal, at least from a sport science and performance perspective. And when you give a sport coach two hours to practice, 99.9% of the time they are going to use the full two hours, regardless of how well the athletes perform in practice.

For the physical preparation coach, it becomes very difficult to include more work – regardless of how necessary it is – on top of the already onerous physical requirements of practice. Hence, establishing a protocol of micro-dosing some key training elements on a daily basis becomes quite appealing if you really need to get these elements trained properly. Instead of working for one hour, two to three times per week, why not do 15-20 minutes of work every day to accumulate the work you need? The accumulation of work on a daily basis allows athletes to never get to far away from the skills (i.e. sprinting) being trained. The combination of high-intensity (at or near maximal output) and low volume provides the necessary stimulus for improvement and, at the very least, the maintenance of these preferred qualities without creating excessive fatigue and an environment for injury. Going back to the testosterone analogy, you can still achieve significant benefits with micro-dosing, while minimizing the unwanted side-effects.

My formulation of "micro-dosing" protocols has come from two significant sources. Firstly, when I was doing work with Charlie Francis on speed programs for high performance athletes, he introduced some common-sense protocols for use of speed and maximal strength work during taper protocols as the total volume of work was being reduced. During the preparatory training periods, he would always place all high-intensity elements on three days of the week, separated by no less than 48 hours of recovery to allow for appropriate central nervous system regeneration. However, in a 10-day taper program, Charlie allowed for high-intensity elements to occur on almost every day – speed on one day and weightlifting on the next – because the overall volume of work was significantly less than prescribed during the preparatory periods. In effect, he was "micro-dosing" high intensity elements throughout the taper period to keep the athlete sharp and ready, but not prescribing too much density of work to create fatigue (central or peripheral) or soreness. I also noticed that he would use this same philosophy in early general preparation phases. Because the athletes were not generating high levels of force or speed in the early weeks of training, he was able to prescribe combinations of speed work, jumps, throws and weightlifting activities on subsequent days – without creating too much residual fatigue.

The second impetus for my micro-dosing approach has been some of the consulting work I have done with professional teams in North America. Because recent collective bargaining agreements have not allowed for any significant mandatory off-season training for players by their physical preparation staff, more work has been crammed into a smaller amount of time to make up for this deficit of training. Numerous practice sessions and meetings are performed throughout a training camp period, and even into the regular seasons, leaving very little time or energy for work on critical training elements. My job has been to examine a team's practice, competition and meeting commitments, and then identify discrete opportunities for working on speed and recovery protocols without putting the athletes over the top. Some of this work may involve a review of existing player GPS data and other monitoring technologies in an effort to determine existing workloads and player physiological status throughout a training period. The key is to prescribe the right amount of work at the most optimal times to elicit a positive training response, but avoid placing too much stress on the athlete that can be compounded by the rigors of practice. This is not an easy task. The results of micro-dosing protocols of speed and tempo work have been encouraging, with a significant reduction in soft-tissue injuries in training camp and regular season scenarios.

The use of linear sprinting repetitions in low doses can be useful in preparing athletes for those times when they need explosive bursts of speed or near-maximum velocity efforts in games. Maximal linear sprinting also provides a profound general stimulus through the brain and body that transfers to other tasks involving strength, power and speed. Assuming that many athletes will achieve maximum velocity at 20 to 30 meters into a sprint, it follows that repetitions of no more than 20 to 40 meters – depending on the competition requirements of individual players – would be adequate. In order to maximize the benefit of these runs, maximal recovery is also required. A 20 meter sprint effort may require no less than 2-3 minutes of recovery, while a 40 meter sprint could require five minutes. Given that time is always in short supply, it follows that only three repetitions of 20 meters or two repetitions of 40 meters may be all that is required for maximum benefit, particularly if this is done as a daily regimen. Remember, if the intensity is maximal, the overall volume need not be high. A few repetitions will do.

On the other end of the spectrum, low intensity work in the form of tempo runs can be done on a daily basis to accumulate work for the purpose of general conditioning and recovery. If a typical tempo session of 1,500 meters is performed a few times per week in off-season training, smaller doses of 30-40% of the off-season volume (450 to 600m) can be useful in maintaining general fitness qualities and improving circulatory mechanisms during training camps and in-season periods. Once again, the volume of work is not so high as to create excessive fatigue, but high enough to elicit a desirable response.

With regards to implementing an appropriate micro-dosing program with speed and tempo work, the following guidelines must be kept in mind:

1. **Get your speed work done before practice or in the early part of practice as part of a warm-up sequence.** Once athletes are fatigued from the main portion of practice, quality speed work will not be possible. Thus, it follows that you should not try to implement speed work after practice. The athletes will not want to do it and the overall risk-to-reward ratio is in favor of risk. If done early in the session, athletes will also feel more "activated" throughout practice. The regular warm-up routine can be followed up with three to four repetitions of quality sprint efforts. Once out of the way, the coaching staff can get on with addressing their goals and objectives in practice, while you have finished achieving your objectives. This is a win-win situation for the physical preparation coach.

2. **Always be mindful of technical considerations.** When quality sprinting is being done, always keep a watchful eye on your athletes. This is the time when small adjustments to technique can be made to enhance overall performance and efficiency of movement. If necessary, simple drill can be incorporated to address specific technical issues should they arise. Also, do not downplay the importance of addressing mobility issues, particularly through the hips. If an athlete is tight and restricted, power output during sprinting, or any other explosive movements, will be compromised.

3. **Don't be afraid to do less.** If athletes do not seem to be responding to the workloads, don't be afraid to discontinue the work and move on to something else. Nowhere is it written that "X" amount of sprints is the answer. As a coach, you have to constantly assess the situation. Are athletes running to their capabilities, or is fatigue slowing them down? More volume is typically not the answer. An overall higher quality of work may be the answer.

4. **Educate your athletes on the benefits of micro-dosing these training activities.** Athletes will be resistant to doing tempo running, particularly at the end of practice when they are beat up from practice. However, every time I end up convincing athletes of the benefits of smaller, frequent doses of tempo runs, they always thank me later because they feel much better. Do not be afraid to educate them on the reasons behind performing small dose workouts, as there can be a lot of bang for their buck. Once they understand the value of these smaller amounts of work, they will be more likely to buy in and carry the sessions out with the appropriate levels of intensity.

5. **Always consider the "general" benefits of the work you are prescribing.** In a time when everyone wants to be overly-specific with all the work they prescribe, moving in the direction of "general" appears to provide more significant and long-lasting benefits. While there are specific benefits to be accrued by sprinting for speed-based sports, there are also general neuromuscular benefits that transfer to elastic qualities for agility, explosive power and overall strength. The adaptive response to the general stress imposed on the central nervous system by maximal sprinting can pave the way for the improvement of other qualities. Similarly, the general benefits of tempo running can improve recuperative abilities in athletes and positively impact general fitness qualities.

The "micro-dosing" approach can be very helpful for physical preparation coaches that do not have the power or influence to change a head coach's ideas on optimal practice content and structure. In a perfect world, all coaches would plan their training sessions based on sport science concepts and not tradition or "what we have always done." Unfortunately, physical preparation coaches have to work around these constraints and develop innovative ways to achieve the objectives of making their athletes faster, stronger and more resilient, without piling on additional work. Sprint training and tempo running are simple means of achieving these ends and do not require any fancy equipment. However, the micro-dosing concept can also be adapted to other high-intensity modes of training including plyometrics, explosive medicine ball throws and various maximal weightlifting movements – as long as coaches understand that "less is more." The cumulative effect of low dosage, high-intensity work can be profound over the long term. The key is to find the correct amounts of high intensity work required to move the athletes forward and not backwards. My advice to coaches interested in applying this concept is to start with one or two training modes – applied in a simple manner – to easily monitor the efficacy of the program. As you become more adept at identifying optimal dosages, other high intensity work can be substituted gradually to provide a variety of stimuli to keep the athletes in an adaptive state.