



# Microdosing: A Practical Approach to Programming in Professional Basketball

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## Abstract

The professional basketball setting is extremely challenging on athletes who must meet the demands of playing, schedule density, travel, and media. Beyond this, athletes must also keep their body in prime condition through sports medicine and strength and conditioning sessions. The strength and conditioning coach is faced with the challenge of providing adequate stimulus while being on the road and having multiple games every week. Microdosing is a method of programming which involves short sessions focusing on 1-2 primary and accessory exercises. This provides a concise stimulus that allows coaches to have their athletes in the weight room 3-4 times per week while allowing them enough time to recover, practice their sport, and ultimately peak on the court.

**Keywords:** Strength; Conditioning; Periodization; Programming; Basketball; Microdosing

## Introduction

Introduction: Basketball is classified as a sport with a large amount of acceleration, deceleration, change of direction, and jumping [1]. From a metabolic demand standpoint, it has both aerobic and anaerobic components<sup>1</sup>. However, the anaerobic demand is greater due to the short bursts on the court during offensive and defensive possessions [2]. Due to the frequent amount of physicality involved in scoring perimeter shots and driving to the basket, previous authors have also identified basketball as a contact sport [3]. Other contact sports include rugby and football, in which extensive strength and conditioning programs are implemented to improve athletic performance [4]. However, the history of strength and conditioning in basketball is young and only recently has evolved thanks to the coaches involved in professional basketball [5]. Likewise, athletic trainers and physical therapists strive to create "prehabilitation" programs to focus on athletic weaknesses/deficiencies and mitigate the risk of injury [6]. At its core, these programs share the commonality of either increasing range of motion or increasing the strength of hard tissue (joint) or soft tissues (muscles, tendons) [7]. Thus, the overlap between prehab,

corrective exercise, and strength and conditioning programs are large in that they aim to increase athletic performance [8]. At the high school level, the primary challenge for implementing a strength and conditioning program is the finding of a qualified professional (NSCA-CSCS) [9]. At the collegiate level, the primary challenge depending on the level (Division 1 vs NAIA) may be resources and academic responsibilities [10,11]. Professional basketball poses the unique challenge of adding a high game density schedule and travel [12]. The professional basketball season lasts from October-April (82 games) with possibility of post-season play (April-early June) [13]. The average game density is 3.4 per week during the season. Also, it is not uncommon for athletes to travel at least 1 time zone during trips which makes circadian rhythm prone to disruption and sleep hygiene difficult to maintain [14]. Within season, the number of games makes practices concise, skill-based, and focused on tactics since the cardiovascular component is largely handled on the court. Thus, the strength and conditioning professional is faced with the dilemma of when to implement strength and conditioning programs [15]. The purpose of this paper is to introduce, review,

and provide practical recommendations in using microdosing in the professional basketball strength and conditioning. Microdosing is a training method that involves applying frequent yet small doses which have a positive, cumulative effect on athletic performance. Currently, the research on Microdosing shows that more frequent sessions have no deleterious effect on maximal strength compared with less frequent, higher volume sessions [16,17].

**Strength and Conditioning in Professional Basketball:** As in other settings, a strength and conditioning program must be implemented as one piece of the overall sporting program [18]. The traditional approach specific to professional basketball includes lifting pre-practice, lifting post-practice, or lifting around game days. Most coaches will approach the basketball athlete from the classical programming approach: off-season, pre-season, in-season, and post-season [19]. This approach is based on linear periodization which states the off-season includes high volume paired with low intensity [20]. As the team enters the in-season phase, this is where the athlete should peak, performing low volume paired with high intensity [21]. Another approach has become popular within the field: undulating periodization [22]. This approach can either be daily or general. Daily undulating periodization includes being able to manipulate sets, volume, and intensity as seen fit by the strength and conditioning coach [23]. While general undulating periodization can manipulate the variables in any phases of annual competition [23]. However, this still poses a problem in professional basketball due to a lack of time for implementation.

### Linear Periodization

Linear Periodization (also known as classical periodization) is characterized by the transitioning from higher volume and lower intensity in the off-season into lower volume and higher intensity during the in-season [20]. The main tenets of this periodization schema are that the off-season is geared towards hypertrophy and basic strength [24]. Pre-season and first transition phases target maximal strength, and this is seen as the mid-point between volume and intensity [25]. As the in-season approaches, this is where hypertrophy and strength gains are transformed into power and explosive strength [26]. While this approach is logical, it uses the assumption that athletic progress is linear and predictable. Furthermore, the schedule and travel demand of professional basketball mean coaches will not have access to their home facility for at least half of the season and may have to utilize visiting team facilities or hotel gyms of which standards and equipment are unknown. This is the greatest challenge of using linear periodization in professional basketball.

### Non-Linear Periodization

Also known as undulating periodization, non-linear periodization grew as an alternative to the regiment of linear periodization [27]. Undulating periodization can be implemented into mesocycles or daily training cycles [28]. The term undulating means “varying”, that sets, volume, and intensity can be changed

to meet the evolving needs of athletes. For example, while linear periodization would state in-season strength and conditioning sessions should consist of low-volume, high-intensity work. Undulating periodization could be used in the setting of professional basketball because not all players obtain the same playing time [29]. For example, the 5 starters will most likely play 35-40 minutes while the second line and role players may clock between 10-25 minutes [30]. This means that volume and intensity can't be generally used with all players because the intended stimulus will be much different. As described by Bove, higher minute athletes should focus on recovery and keeping their skills sharp [31]. While lower minute athletes have the wiggle room to add in volume or intensity into the sessions to keep their fitness and readiness levels high [30]. The differing needs of the professional basketball team means that non-linear periodization may be useful, however, the amount of time spent in each session (45-60 minutes) may still be too long for optimal performance on the court. For example, the traditional 45-60-minute session may impose too much stress on the body without giving proper time for rest and recover. Furthermore, the ultimate goal of strength and conditioning is to improve on court performance which may not be possible if the athlete is fatigued.

### Microdosing

The term microdosing has transformed from many iterations from researchers and coaches such as David Joyce (High Performance Training for Sports 2021) [32], Daniel Bove (The Quadrant System, 2021) [30], and Bill Burgos with Javair Gillett (Strength Training for Basketball, 2021) [33]. From a practical framework, Geoffrey Puls and Cory Schlesinger have led the charge in the NBA setting which has trickled to the G-League and some European Basketball leagues. In its simplest terms, microdosing seeks to find the minimal stimulus needed to achieve the desired stimulus (strength, power, endurance) [32]. This resonates within the professional setting because of time restrictions, travel demands, and game density. Furthermore, this gives the strength and conditioning coach the ability to establish buy-in and foster relationships with the athletes [34]. The modern weight room transcends the stigma of being merely weights and emphasizing muscular hypertrophy. Instead, the modern weight room as it relates to basketball is a place to improve jumping/landing mechanics, assess neuromuscular readiness, and create resilient athletes. As the Basketball strength and conditioning coach strives to find the time to fill all the buckets, the pressing question becomes when all of this can be accomplished. This is where microdosing can play a role. For example, where the traditional weight room or court conditioning session can last from 45-60 minutes, a micro session may last from 15-25 minutes [33]. This means that from a time standpoint, less time is spent in the weight room and more time on the court working on skill, off-court recovering, or promoting work-life balance for the athlete. From a volume and intensity standpoint, volume decreases but the stimulus is maintained either through higher frequency (multiple sessions per week) or higher

intensity [35]. Microdosing seems to be adaptable in that it may follow linear or non-linear periodization yet more closely follows the variety of non-linear periodization [35]. This method can also serve as an alternative when it comes to efficiency because even at the professional level, there may only be 2 full time strength and conditioning coaches. Serving athletes in 15-25-minute increments allow for further individuality of programming, greater focus for the coach/athlete, and being efficient with the overall practice plan. The next section will give practical examples of each philosophy with comparison/contrasts.

### Linear Periodization (In-Season)

In the NBA, 82 games are played throughout the regular season with a weekly average of 3.4 [36]. This can increase to 100 if the team goes to the post-season (playoffs). This can make keeping a consistent program in the weight room difficult, especially with the uncertainty of visiting team facilities and hotel gyms. The average weight room session in-season can last from 45-60 minutes and focuses on explosive strength/power. This translates into an average twice a week session characterized by low volume and high intensity lifting. Please see Table 1 for the detailed explanation.

**Table 1:** In-season Linear Periodization (focus on converting max strength into power).

Monday	Tuesday	Wednesday	Thursday	Friday
Warm-up/Prehab		Warm-up/Prehab		Warm-up/Prehab
Barbell Deadlift 4x5 @ 80-85%		FrontBack Squat 5x3 @80%		Clean High Pulls 4x4 @85%
Front Squat 3x6 @85%		Barbell Strict Press 4x6 @80%		Barbell Lunge 4x5 @80%
Pendley Row 4x8 @75%		Pull-ups 3x8		DB Incline Press 3x6@ 85%
DB Lateral Lunge 3x8		GHD Back Extension 3x8		Nordic Hamstring Curl 3x6
Front Plank 2x45 sec.		Standing Y-fly 3x10		Reverse Hamstring Curl 3x6
Side Plank2x45 sec.		Dead bugs 2x20		Pallof Press 2x112

### Non-Linear Periodization (In-Season)

Using the undulating model as the next example, this strength and conditioning session would last the same amount of time (45-60 minutes). Frequency would also be similar at 2-3x/week. The biggest differences between linear and non-linear periodization would be the volume and intensity set for each session. While linear periodization already has a regimented amount of intensity

and volume set, non-linear periodization does not. This allows the strength and conditioning coach to better assess and meet the needs of their athletes throughout the season. For example, in the event a low minute athlete (<20 minutes) must quickly step into the starting rotation, this would impact their post-game or next day session. It is in events like these where the non-linear philosophy shines and can be very useful to the sports performance staff (Table 2).

**Table 2:** In-season Non-linear Periodization (focus on converting max strength into power).

Monday	Tuesday	Wednesday	Thursday	Friday
Warm-up/Prehab		Warm-up/Prehab		Warm-up/Prehab
Barbell Deadlift 4x5 @ 80-85%		Back Squat 2x12 @60%		Clean High Pulls 3x3 @90%
Front Squat 3x6 @85%		Barbell Strict Press 3x8 @65%		Barbell Lunge 3x4 @85%
Pendley Row 4x8 @75%		Pull-ups 2x6		DB Incline Press 3x4@ 85%
DB Lateral Lunge 3x8		GHD Back Extension 2x10		Nordic Hamstring Curl 3x6
Front Plank 2x45 sec.		Standing Y-fly 2x10		Reverse Hamstring Curl 3x6
Side Plank2x45 sec.		Dead bugs 2x12		Pallof Press 2x10

### Microdosing (In-season)

A potent way to overcome the demands of professional basketball while still giving each athlete adequate stimulus may be through Microdosing. Microdosing states that volume and intensity can be manipulated daily if needed but focuses on short sessions (15-25 minutes) to keep frequency higher. This has the psychological benefit of encouraging athletes to get into the weight room as this can be a challenge regarding compliance [37]. Also, this approach allows for volume and intensity to be kept more consistent which is vital during in-season. It has been found that lack of physical activity and exercise can lead to greater levels of

muscular soreness [38]. This is the foundation of “active-recovery” seen when after gamedays athletes will ride the bike or go on light runs, this is to expedite the removal of metabolic waste from the body which is partially responsible for delayed onset muscle soreness38. Microdosing can keep athletes moving 3-4 days per week instead of the usual 1-2 (in-season professional basketball standard) so they can remain loose and fresh leading into games. Lastly, by having all athletes in the weight room 3-4 times per week, the gap between high and low-minute players can be minimized to maintain comparable fitness levels within the whole team (Table 3).

**Table 3:** In-season Microdosing (focus on converting max strength into power).

Monday	Tuesday	Wednesday	Thursday	Friday
Warm-up/Prehab	Warm-up/Prehab	Warm-up/Prehab		Warm-up/Prehab
Barbell Deadlift 4x4 @ 80%	Barbell Strict Press 3x6 @75%	Trap Bar Deadlift 25x3 @70%		Clean High Pulls 3x3 @90%
Side Plank 2x30 sec.	Front Squat 2x45 sec.	Rotational Med Ball Slams 3x5		Split Squat 2x6 @ 50%
Pullups 3x8	Bent over DB row 2x8	Dead bugs 2x12		Pallof Press 2x12

## Limitations

This paper is based on both clinical and empirical evidence which is a strength and weakness. Strength and conditioning is a rich field backed by incredible professional organizations such as the NSCA (National Strength and Conditioning Association) and ASCA (Australian Strength and Conditioning Association). There is much research into philosophy, programming, and periodization practices across sport. However, this paper seeks to provide a practical application method into a homogenous population. The conclusions of this paper are therefore only intended for application into the professional basketball setting. Coaches can certainly use this framework into the collegiate and semi-professional setting as there are overlapping similarities. Future research should seek to compare microdosing to other styles of programming with dependent variables being on-court performance, injury risk, and athlete compliance.

## Conclusions

Professional Basketball athletes in the National Basketball Association (NBA) must compete in 82 regular season games of which 50% are played on the road [34]. Athletes have competing demands within the confines of their sport including team practice, individual skill sessions, strength and conditioning sessions, and travel. Strength and conditioning within basketball has become increasingly popular within the last 10 years. The old dogma that being in the weight room makes athletes bulky and slower are largely gone thanks to the influences of evidence-based practices combined with coaching practical experience [39] and other performance coaches. The biggest challenge to getting athletes in the weight room today is perceived lack of time and compliance. How can strength and conditioning coaches parlay the importance of sessions from an increased performance and decreased injury risk? This can be achieved through using the principles of sport psychology and organizational leadership which every coach must have competency in. The principles of sport psychology are used by the coach to find the correct approach in training each individual athlete and get their best effort and energy [34]. Similarly, by using principles of organizational leadership, one can establish personal and professional relationships with each athlete for the purpose of helping them achieve optimal performance [40]. One way of overcoming the lack of perceived time is through microdosing. Microdosing seeks to preserve the overall stimulates of traditional philosophies (linear and non-linear periodization) by reducing total time of session but increasing frequency. This serves to encourage compliance from athletes as 20-minute sessions are more palatable than 45-60 minutes sessions. Also, the higher

frequency means athletes can stay primed from a neuromuscular standpoint because with the traditional schema of 1-2 days per week there is chance of increased soreness when stepping onto the court. Lastly, microdosing may have the advantage of closing the gap between high- and low-minute athletes because the overall frequency would be identical, with only varying in intensity. This could have positive implications for any player coming off the bench in the staff's belief they are in shape enough to play and perform. Overall, microdosing provides an alternative approach in programming within professional basketball. At the very least, this article gives practical examples and evidence as to how microdosing in an alternative approach to traditional programming styles and may be more suited to this demographic.

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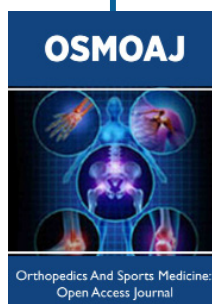
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