

BIO-LOGICAL EXERCISE™ FOR BASKETBALL

How One of the Fastest Games on Earth is Benefiting from One of the Biggest Advances in Performance Training

An Applied Physiology White Paper

For Coaches, Athletic Trainers, Physical Therapists, Sports Medicine Professionals, and Basketball Players

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Educational Disclaimer:

This document is intended for educational purposes only.

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1. Basketball Demands More Than Talent

Basketball is one of the most explosive sports in the world.

- Every practice...
- Every possession...
- Every rebound...
- Every fast break...

Requires athletes to repeatedly produce explosive power while managing tremendous physical stress.

Elite basketball players don't simply run.

They sprint.

Jump.

Land.

Cut.

Accelerate.

Decelerate.

Change direction.

Then do it again...Hundreds of times during a single game.

Success requires explosive lower-body power, upper-body strength, muscular endurance, rapid recovery, coordination, balance, and the ability to perform at a high level through long practices, demanding travel schedules, and an entire competitive season.

For decades, basketball players have been taught that becoming more explosive simply requires doing more.

More squats. More jumping. More conditioning. More weight. More repetitions.

While hard work will always be part of becoming a great basketball player, modern sports science is asking a different question:

Can athletes create greater **biological** adaptation while placing less mechanical stress on their bodies?

BIO-LOGICAL EXERCISE™ training proves that the answer is yes.

2. What Is BFR, and Why?

Why Coaches are implementing BFR

- ✓ Increase vertical jump
- ✓ Improve first-step explosiveness
- ✓ Reduced fatigue in the 2nd half
- ✓ Build strength with lighter resistance
- ✓ Reduce joint stress
- ✓ Recover faster between practices and games
- ✓ In season load maintenance
- ✓ Maintain muscle during long seasons
- ✓ Return to play sooner after injury

Blood Flow Restriction (BFR) training uses specialized bands placed around the upper arms or upper legs to partially restrict venous blood flow while maintaining arterial inflow.

This creates a unique **biological** environment inside the working muscle.

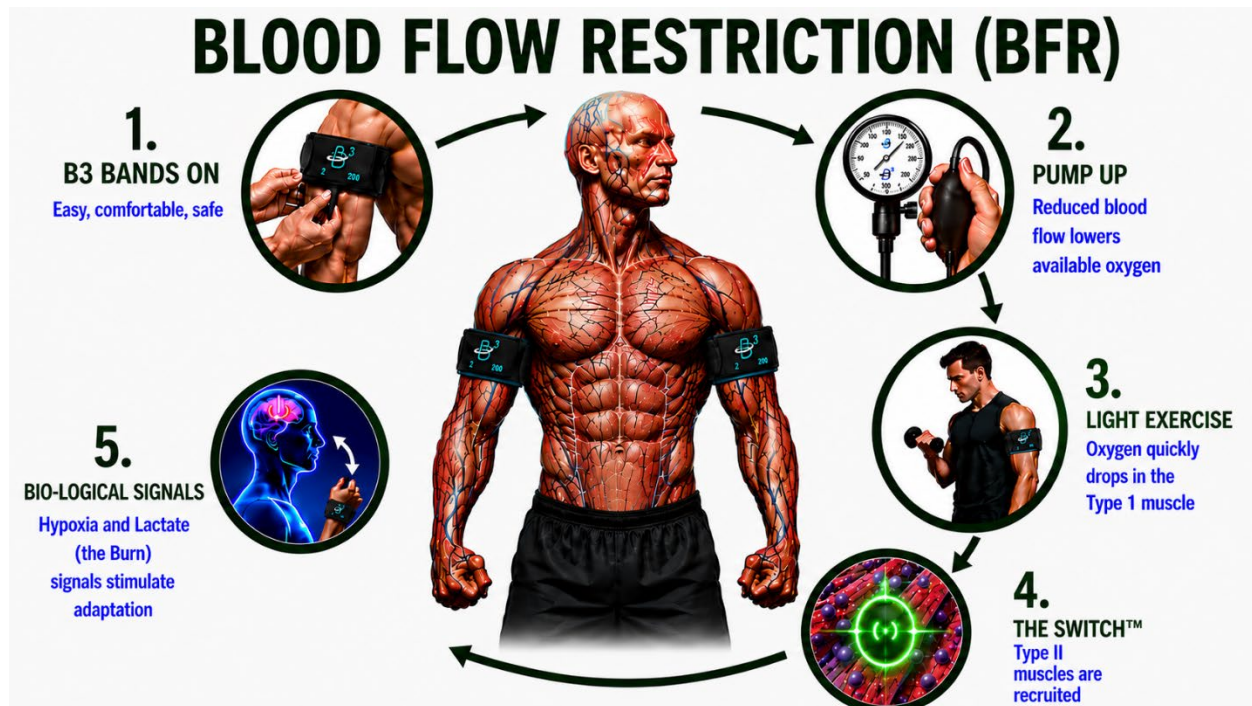
Instead of relying on heavy loads, BFR increases the body's metabolic response, recruiting more muscle fibers while stimulating powerful adaptive processes.

Today, more than *12,000 scientific publications* and *hundreds of peer-reviewed studies* have investigated BFR across athletic performance, rehabilitation, aging, cardiovascular health, and muscle development.

The research consistently demonstrates improvements in:

- Muscle strength
- Muscle hypertrophy
- Explosive power
- Muscular endurance
- Recovery

- Performance using lighter resistance



3. BIO-LOGICAL EXERCISE™ -

The Difference Between a Tool and a System

Blood Flow Restriction (BFR) is a training technology.
BIO-LOGICAL EXERCISE™ is a performance system.

Think of it this way...BFR is the vehicle.
BIO-LOGICAL EXERCISE™ is the operating manual.

The BFR bands create the biological environment. **BIO-LOGICAL EXERCISE™** teaches athletes and coaches how to use that environment to produce the greatest possible adaptation.

While BFR research has demonstrated remarkable improvements in strength, muscle growth, power, endurance, rehabilitation, and recovery, simply putting on a pair of bands does not guarantee optimal results.

Questions immediately arise.

1. How long should the bands stay on?
2. How much exercise is enough?
3. Should athletes train before practice...after practice...or on recovery days?
4. When should the goal be performance?
5. When should the goal be recovery?
6. When should the goal be long-term development?

Those questions led to the development of **BIO-LOGICAL EXERCISE™**.

After more than a decade of working with athletes, coaches, rehabilitation professionals, and sports medicine teams, and after conducting more than 3,500 BFR training sessions, one consistent pattern emerged.

The greatest results did not come from simply using BFR. They came from applying the right biological signal at the right time for the right purpose.

That philosophy became the foundation of **BIO-LOGICAL EXERCISE™**.

Rather than focusing primarily on heavier weights, longer workouts, or greater training volume, **BIO-LOGICAL EXERCISE™** focuses on creating precise **biological** signals that stimulate the body's natural adaptive systems.

The objective is simple: Produce more adaptation with less unnecessary stress.

The result is a practical framework that helps athletes improve performance, recover more efficiently, reduce joint stress, and continue progressing throughout an entire season.

4. Basketball BFR Research

Although BFR has been studied across dozens of sports, basketball research has grown rapidly over the past decade.

Researchers have investigated its effects on:

- Vertical jump
- Sprint speed
- Change of direction
- Lower-body strength
- Explosive power
- Endurance
- Recovery

Studies consistently report improvements in performance while allowing athletes to train with substantially lighter loads than traditional resistance training.

Several investigations have demonstrated improvements in jump performance, force production, and muscle development, making BFR an attractive addition to basketball strength and conditioning programs.

Study: Blood Flow Restriction During Small-Sided Games Enhances Physiological Adaptations and Performance Improvements in Well-Trained Basketball Players (2025)

Published: Liu et al. — *Journal of Sports Sciences*

Key findings included:

- Greater improvements in repeated sprint ability
- Significant increases in vertical jump height
- Improved anaerobic power
- Improved agility (T-Test)
- Greater improvements in peak aerobic power compared with basketball training alone
- Demonstrated that adding BFR to basketball-specific training produced superior performance gains compared with identical training without BFR

Link: <https://pubmed.ncbi.nlm.nih.gov/41145402/>

Study: Low-Load Blood Flow Restriction with Elastic Bands vs. Heavy-Load Training in In-Season Collegiate Basketball Players (2026)

Published: He et al. — *Journal of Sports Sciences*

Key findings included:

- Superior improvements in vertical jump height
- Faster 30-meter sprint performance
- Similar maximal strength gains compared with heavy-load training
- Achieved with approximately 30% 1RM instead of traditional heavy loads
- Reduced mechanical stress while maintaining or improving athletic performance during the competitive season
- Increased knee flexor force
- Improved rate of force development
- Increased squat jump height
- Increased countermovement jump height
- Superior explosive power when combining BFR with traditional strength training

Link: <https://www.tandfonline.com/doi/abs/10.1080/02640414.2026.2643950>

Study: Functional Training Combined with Blood Flow Restriction in Basketball Athletes (2026)

Published: Frontiers in Physiology

Key findings included:

- Greater improvements in lower-body strength
- Faster sprint performance
- Improved endurance
- Favorable changes in body composition
- Demonstrated superior adaptations over functional training alone during a 24-week program.

Link:

<https://www.frontiersin.org/journals/physiology/articles/10.3389/fphys.2026.1789909/full>

Study: Blood Flow Restriction Moderate-Intensity Interval Training in Male College Basketball Players (2025)

Published: BMC Sports Science, Medicine and Rehabilitation

Key findings included:

- Improved aerobic capacity
- Improved anaerobic performance
- Enhanced jumping performance
- Faster sprint performance
- Comparable or superior adaptations to high-intensity interval training while using lower exercise intensity

Link: <https://pmc.ncbi.nlm.nih.gov/articles/PMC11889921/>

Study: Repeated Sprint Training with Blood Flow Restriction in Basketball Players (2020)

Published: *International Journal of Human Movement and Sports Sciences*

Key findings included:

- Improved repeated sprint performance
- Increased lower-body strength
- Enhanced anaerobic capacity
- Improved aerobic performance
- Suggested BFR is an effective addition to repeated sprint training in basketball athletes

Link: https://www.hrpub.org/journals/article_info.php?aid=10440

Study: Effects of Blood Flow Restriction Training on Physical Fitness Among Athletes: A Systematic Review and Meta-analysis

Published in: Scientific Reports

Review of:

- 28 studies

- 542 athletes

Conclusion:

BFR had a positive effect on the physical fitness parameters of the athletes, with significantly improved:

- Strength
- Power
- Speed
- Endurance
- Body composition

Link: https://www.nature.com/articles/s41598-024-67181-9?utm_source=chatgpt.com

5. Why This Matters

Basketball players already place enormous stress on their bodies.

- Jumping.
- Landing.
- Cutting.
- Practice.
- Games.
- Travel.
- Weight training.
- Conditioning.
- Recovery.

The challenge isn't adding more stress. The challenge is producing a stronger **biological signal** while reducing unnecessary wear and tear.

That may be one of the greatest advantages **BIO-LOGICAL EXERCISE™** offers today's basketball athlete.

6. Beyond Strength

The potential benefits of BFR extend well beyond building muscle.

When properly integrated into a basketball program, BFR may help athletes:

- Improve strength while using lighter loads
- Develop explosive power and vertical
- Increase endurance and repeatability
- Maintain muscle and performance throughout a long competitive season

- Recover between practices, games and tournaments
- Reduce joint stress
- Continue training during rehabilitation

Rather than replacing traditional basketball or strength training, BFR complements both by enhancing the body's biological response to exercise.

BUILDING STRENGTH & ENDURANCE FOR BASKETBALL



1 MUSCLE ACTIVATION

Even light resistance activates Type II muscle fibers when the right signal is created.



2 LACTATE BUILDS

Restricted blood flow causes lactate to accumulate, creating the familiar "burn."



3 BIO-LOGICAL SIGNALS TRIGGERED

Lactate and metabolic stress trigger the release of Growth Hormone (HGH) and other anabolic signals.



4 ANABOLIC ADAPTATION

Elevated natural anabolic hormone elevation leads to better adaptation.



5 STRENGTH AND ENDURANCE

More Muscle, More Explosion, More Endurance, Better Performance
All from less weight, less stress, and less time.

7. The 1-5-10 Method™

After more than a decade of working with athletes and conducting over **3,500 BFR training sessions**, one pattern became clear.

Not every training session should have the same purpose. Some days an athlete needs to prepare for competition. Some days the priority is recovery.

Other days the goal is long-term performance development.

That realization led to the development of the **1-5-10 Method**, a simple framework that matches the **biological** stimulus to the athlete's immediate objective.

1 Minute — Compete Better Today

Prepare the body to perform.

- Activate the nervous system

- Improve muscle recruitment
- Prepare to compete

5 Minutes — Recover Better Tomorrow

Create adaptation while minimizing unnecessary fatigue.

- Build muscle
- Maintain strength
- Recover without excessive fatigue

10 Minutes — Become a Better Performer

Develop long-term athletic capacity.

- Increase explosive power
- Build on court endurance
- Develop long-term durability

The 1-5-10 Method™ for basketball is not simply another workout.

It is a practical system that helps coaches and athletes determine **when, why, and how much** BFR to use based on the demands of training, recovery, and competition.

8. Bio-Logical Basketball Exercises

Understanding the science behind Blood Flow Restriction is only the first step. The greatest challenge for coaches is not simply deciding whether to use BFR, but knowing when, why, and how to use it throughout a season.

Organizations that implement the B3 Sciences System receive more than Blood Flow Restriction bands. They gain access to the **BIO-LOGICAL EXERCISE™** methodology, including sport-specific protocols, coach education, athlete instruction, and on-court demonstrations (when available), designed to help players perform better, recover faster, and continue developing throughout the season.

The following diagram highlights eight primary exercises that can be incorporated into **BIO-LOGICAL EXERCISE™** protocols for basketball athletes.



Exercises 5, 6 and 8 can be done with tubing or dumbbells

9. Looking Ahead

Blood Flow Restriction training is no longer an emerging concept.

It is a growing field of sports science supported by thousands of publications and an expanding body of wrestling-specific research from around the world.

As coaches continue searching for ways to improve performance while protecting athletes from excessive wear and tear, BFR offers a compelling new tool.

For basketball players, success has always been built on discipline, preparation, and repetition.

The next competitive advantage may come from understanding something even more fundamental:

Biology drives adaptation.

The future of basketball performance may not belong to those who simply train harder.

It may belong to those who create the strongest **biological** signal.

10. About the Author

Clinical Background and Philosophy

Dr. Mike DeBord is an educator, clinician, and innovator with more than two decades of experience in exercise science, rehabilitation, and human performance.

As Founder of B3 Sciences, he has spent more than a decade studying the practical application of Blood Flow Restriction across athletes, older adults, rehabilitation patients, and individuals living with chronic disease.

His work led to the development of the **1–5–10 Method™**, a practical system designed to make Blood Flow Restriction simple, repeatable, and accessible for individuals of every fitness level.

Building upon thousands of training sessions and years of clinical observation, Dr. DeBord introduced the broader concept of **Bio-Logical Exercise™**—an approach that emphasizes creating precise biological signals rather than relying primarily on greater load, longer workouts, or higher training volume.

His philosophy is simple:

The body responds to biology.

When the correct biological signals are applied safely and consistently, remarkable adaptations become possible.

11. Why the B3 Sciences Bands?

BIO-LOGICAL EXERCISE™ is built upon one fundamental principle: creating the right biological signal while minimizing unnecessary mechanical stress. The Blood Flow Restriction device used to deliver that signal is therefore an important part of the overall system.

The B3 Sciences Multi-Chamber Bands were selected as the preferred Blood Flow Restriction system for **BIO-LOGICAL EXERCISE™** because their design aligns with the physiological principles discussed throughout this paper. Their semi-elastic, pneumatic, multi-chamber construction is designed to distribute pressure more evenly around the limb while maintaining arterial inflow and restricting venous return—the physiological foundation of effective Blood Flow Restriction.

Published research has increasingly emphasized the importance of cuff architecture, pressure regulation, and pressure distribution for achieving consistent and repeatable Blood Flow Restriction. Compared with narrower or non-pneumatic devices, broader, pneumatic pressure distribution may improve comfort, consistency, repeatability, and reduce unnecessary focal tissue stress.

The design characteristics of the B3 Sciences Bands align with published recommendations supporting:

- Even circumferential pressure distribution
- Lower effective occlusion pressures
- Improved user comfort
- Predictable vascular responses
- Safe, repeatable application

While many Blood Flow Restriction devices are available, the B3 Sciences Bands represent my preferred equipment for implementing the **BIO-LOGICAL EXERCISE™** system and the 1-5-10 Method™. Together, the equipment, methodology, and sport-specific protocols create a practical system designed to help athletes and coaches consistently produce the right biological signal for performance, recovery, and long-term athletic development.



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