Blood Flow Restriction Therapy: A New Approach for Knee Rehabilitation

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Blood flow restriction (BFR) therapy is an emerging treatment for the rehabilitation of orthopedic or trauma-related conditions. It is designed to limit oxygen to the limb, which causes a chemical reaction in the muscle signaling it to make more protein which may result in substantial muscle growth. Traditional strength training requires lifting heavy weights repetitively for a minimum 2-3 times per week for six weeks to achieve measurable muscle strength and size gains.1 For many patients, it is unsafe for them to lift weights immediately following surgery. Blood flow restriction offers an alternative method of strengthening to build muscle mass without causing harm to a healing joint.

So, how does it work? A tourniquet is applied to an arm or leg to provide brief and intermittent stoppage of blood flow while exercising. The cuff is inflated to a specific pressure, personalized for each individual treatment session. The amount of pressure required to cause muscle growth and to increase strength can vary between individuals. Rehabilitation experts trained in BFR use specialized tourniquet systems to reduce just enough blood flow to create positive results while monitoring the limb to prevent any adverse events. This method should only be used by trained professionals.

Recent studies following knee surgery demonstrate that the combination of BFR and standard rehabilitation can increase muscle strength, thigh muscle girth, and improve patient function when compared to standard rehabilitation alone.2 The muscle growth achieved with lighter weight training using BFR is comparable to gains achieved with standard strengthening protocols.3 BFR has also been shown to decrease pain and to improve function following a shorter duration of physical therapy sessions. Shrinking muscle size is commonly seen in patients recovering from knee surgery. Patients may lose up to 20-33% of muscle volume within three weeks of

surgery.4 This deficit may be difficult to regain and can last for years after surgery. In patients undergoing ACL reconstruction, BFR reduced the amount of early muscle shrinkage typically associated with brace immobilization and reliance on crutches.

BFR is not only useful for post-surgical rehabilitation but can be used for patients who do not require surgery. Patients who are unable to perform heavy lifting following knee injury are also great candidates. Others weakened by prolonged immobilization (i.e. casting, splinting, bracing) may benefit as well. BFR is being used before surgery to build strength prior to major knee reconstruction. It is also being evaluated for rehabilitation in other body parts.

In summary, BFR has many evolving applications for musculoskeletal rehabilitation. Early work demonstrates safety and efficacy when compared to standard rehabilitation. The prospect of protecting a healing joint while stimulating muscle growth is intriguing. We will likely be hearing much more about BFR in the future.

References

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