

# SMART CUFFS



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**USER MANUAL**



# STATEMENT FROM OUR FOUNDER

My name is Nick Colosi, and I'm the founder of SmartTools, a company dedicated to developing innovative solutions, specializing in blood flow restriction training and IASTM.

Our company is based in Cleveland, Ohio—famous for the Rock & Roll Hall of Fame and definitely not your typical start-up location. But, we started packaging and shipping right out of my parents' basement and have grown from there.

My background is in sports and medicine, and I wanted to combine those two elements to create products. With my frequent travels, I also spend a lot of time away from home. In those situations, I would often say to myself, "I wish I had this sort of product with me." And you probably do the exact same thing. So, I aim to design products that add the most value to the customer and can suit multiple lifestyles and needs.

However, I believe that it's not only about knowing what products and solutions people want, but also about knowing how they want to be treated. That's why customer service is a major component of what we do at SmartTools. You have questions and want answers, so we take pride in answering those questions promptly. In fact, all emails are answered before the end of the workday, with no carryover.

I designed our SmartCuffs and other SmartTools to be intuitive, safe and so easy to use that anyone can do it without issue. That one-time basement business now has distribution centers in almost 50 countries, showing that if you dream it and believe in it, anything is possible. We're just getting started and look forward to creating even more innovative products that improve the health and wellbeing of the world.

*Nick Colosi*  
Nick Colosi

# A WORD FROM OUR DIRECTOR OF EDUCATION

You should not perform BFR Training without first consulting your healthcare provider. Not every person is a candidate to train in this manner and careful attention should be made to programming and personalized pressure.

Never exceed twenty (20) minutes of BFR on the limbs without reducing pressure.

Establish the ability to perform repetitions of your chosen exercise for 30 reps PRIOR to applying the SmartCuffs. Have an exercise plan in place.

BFR Training should be challenging and difficult, but NOT painful. BFR is not intended for you to exercise to failure. Please make sure you are differentiating PAIN from a CHALLENGE (this is not tended to be a 'feel-good therapy' either).

If any pain, numbness or tightness/discomfort that exceeds a 7/10 is experienced, stop using immediately.

Dizziness and tingling in the hands, fingers or feet and toes is not normal. If you experience dizziness, numbness or tingling attempt to reduce the pressure in 10mmHg intervals until symptoms disappear. If symptoms persist, stop using immediately.

I hope you enjoy using BFR in your training regime as much as I do. I know you will see great results in strength and size in no time!

In health,



*Ed Le Cara, DC, PhD, MBA, ATC, CSCS*

THIS IS THE  
**FUTURE OF REHAB.**

**THIS IS BFR.**

THESE ARE THE  
**SMART CUFFS.**

# WHAT IS LIMB OCCLUSION PRESSURE?

Limb Occlusion Pressure (LOP) is the amount of pressure needed to occlude arterial blood flow. This is the gold standard being used to quantify the amount of pressure needed per user in BFR research. Personalized tourniquet pressure for each individual patient eliminates the need to account for cuff width, limb size, or blood pressure. BFR requires the reduction of arterial inflow and the elimination of venous outflow. By establishing a baseline LOP, we can know how much to reduce the pressure by so you are never exercising at occlusion, which is unsafe.

## HOW OFTEN SHOULD IT BE MEASURED?

LOP/"Personalized Pressure" should be measured every 2-4 weeks. It does not need to be measured every session unless directed by your healthcare professional.

## RECOMMENDED % OF LOP:

**FOR THE ARM** 30%–50% LOP

**FOR THE LEG** 50%–80% LOP

# WHAT ARE CONTINUOUS, INTERMITTENT, AND RESTING BFR MODES?



## CONTINUOUS BFR

The cuffs are inflated during the exercise set and rest sessions.

This will fatigue your muscles at a higher rate.

Ideal for advanced rehab or de-loading joints.



## INTERMITTENT BFR

The cuffs are only inflated only during the exercise session. Deflate during rest session.

Ideal for beginner rehab or de-loading joints.



## RESTING BFR

The cuffs are not inflated during the exercise session. Cuffs are only to be inflated during the rest session.

Ideal for beginner rehab to ease into BFR training (using very light weight) or advanced rehab (using heavier weight).

# DISCLAIMER

## WARNINGS

- » Do not remove screws or attempt to disassemble.
- » Do not charge unattended.
- » Do not immerse in water and keep away from any liquids.
- » Unplug the charger once desired charge is reached prior to use. Do not use product while charging.
- » **Never apply SmartCuffs 4.0 to all four limbs at the same time.**
- » For adult use only. Consult your doctor before using this product.

## SAFETY INSTRUCTIONS & CONTRAINDICATIONS



**DANGER:** To reduce risks of electric shock, fire, and personal injury, this product must be used in accordance with the following.

- » As with any new exercise program/device, consult your physician prior to use of this product. Especially if you have any of the following conditions: History of Deep Vein Thrombosis (DVT), Pregnancy, Varicose Veins, High Blood Pressure, Cardiac Disease, or Lymphedema.
- » For adult use only.
- » Use as instructed within this User Manual.
- » If any pain, numbness or tightness/discomfort that exceeds a 7/10 is experienced, **stop using immediately.**
- » Dizziness and tingling in the hands, fingers or feet and toes is not normal. If you experience dizziness, numbness or tingling attempt to reduce the pressure in 10mmHg intervals until symptoms disappear. If symptoms persist, **stop using immediately.**
- » Never leave the SmartCuffs 4.0 device operating or charging unattended.
- » Never apply SmartCuffs 4.0 to all four limbs at the same time.
- » Do not drop or misuse the SmartCuffs 4.0 device.
- » Do not tamper or alter the SmartCuffs 4.0 device.
- » Do not immerse in water.
- » Examine the SmartCuffs 4.0 device prior to each use.
- » Only charge with supplied charger.

# PRODUCT WARRANTY

SmartCuffs® 4.0 device, cuffs, accessories and other attachments are a Limited One-Year Warranty.

The SmartCuffs 4.0 device, cuffs, accessories, and other attachments are warranted by Smart Tools Plus, LLC, an Ohio corporation (“SmartTools”), against manufacturing defects in material and workmanship for a period of one year from the date of purchase from SmartTools. In the event of any such defect occurring during the warranty period, SmartTools will, at its option, (a) correct the defect by repair or by replacement of the applicable part or component that fails as a result of such

defect, without charge for parts and labor; or (b) replace the device with one of the same or then current design.

The foregoing warranties do not cover normal wear and tear or cosmetic damage, and are void if the device and/or the attachments and other accessories (collectively, the “product”) are not used in accordance with the user manual, are otherwise misused or modified in any way, and/or are repaired or altered by anyone other than an authorized service representative of SmartTools. These warranties expressly exclude transportation, shipping or insurance costs,

or defects, damages, or failure resulting from misuse, abuse, improper or abnormal usage, or neglect.

All replaced parts and products become the property of SmartTools. New or reconditioned parts and products may be used in the performance of warranty service. Repaired or replaced parts and products are warranted for the remainder of the original warranty period only. You will be charged for repair or replacement of parts and products made after the expiration of the applicable warranty period.

# SPECIFICATIONS



# APPLYING THE SMARTCUFFS

## APPLYING THE ARM CUFF

- 1 Wrap cuff around the upper arm (between bicep and shoulder) with the buttons/LED light facing up with the housing situated on the outside of arm. Push the strap of the cuff through plastic Strap Loop. **DO NOT GRAB THE HOUSING UNIT WHILE TIGHTENING.** Apply to the upper arm loose enough to where you are able to slide it around the limb, but tight enough so it doesn't slide down the arm in standing. The bottom flap of the cuff should slide under the top part of the cuff.

***TIP: Do not overtighten*** as it will cause LOP errors, strap loop breakage, and cuff leaks.

- 2 Connect the SmartCuffs 4.0 device to the SmartCuffs app via Bluetooth.
- 3 You are ready to begin to operate the SmartCuffs 4.0 device.

*\*To release air from the cuff in case of emergency, press down on the **Emergency Air Release Button** (location on page 8).*

# APPLYING THE SMARTCUFFS

## APPLYING THE LEG CUFF

- 1 Wrap cuff around the upper leg (closest as possible to hip) with the buttons/LED light facing up with the housing situated on the outside of leg. Push the strap of the cuff through plastic Strap Loop. DO NOT GRAB THE HOUSING UNIT WHILE TIGHTENING. Apply the cuff to the upper leg (closest to hip) loose enough to where you are able to slide it around the limb but tight enough so it doesn't slide down the leg in standing. The bottom flap of the cuff should slide under the top part of the cuff.

**TIP: *Do not overtighten*** as it will cause LOP errors, strap loop breakage, and cuff leaks.

- 2 Connect the SmartCuffs 4.0 device to the SmartCuffs app via Bluetooth.
- 3 You are ready to begin to operate the SmartCuffs 4.0 device.

*\*To release air from the cuff in case of emergency, press down on the **Emergency Air Release Button** (location on page 8).*

# DEVICE OPERATION

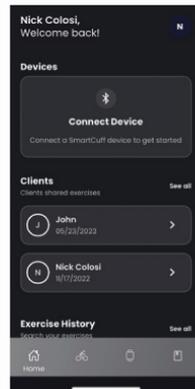
## CONNECT DEVICE

- 1 Open the SmartCuffs app on your phone or tablet and sign in with one of the given options.
- 2 With the SmartCuffs device fastened around your limb(s), press the power button on the device.

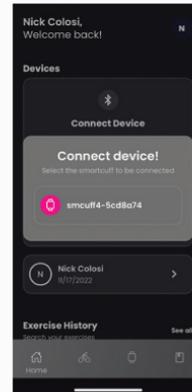
A randomized color will appear and pulsate in the Bluetooth indicator on the device. Pulsating means it is not yet connected.

**TIP:** The color will change after each use. This is done so you do not have to assign the specific cuff to a specific limb for each use.

- 3 On the app home screen, tap “Connect Device”.



- 4 Match the cuff color in the app to the same color on the device (in this example it's pink).

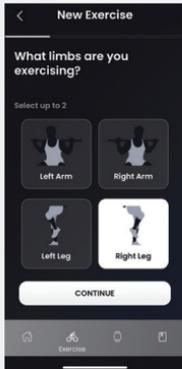


- 5 If exercising with one cuff, tap “Begin Exercise”.
- 6 If exercising with two cuffs, tap “Done” and repeat step 3 to “Begin Exercise”.

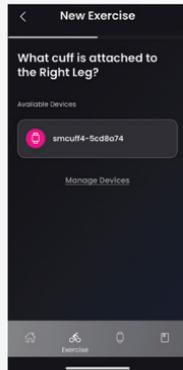
# DEVICE OPERATION

## ASSIGN CUFF TO LIMB AND MODE SELECTIONS

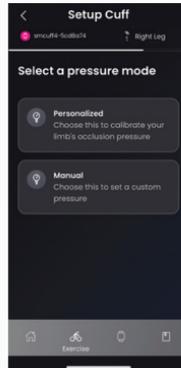
- 1 Assign up to two cuffs.



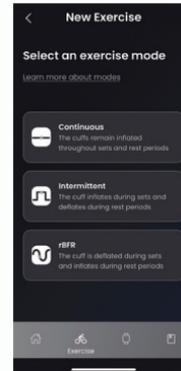
- 2 Match the cuff color to the selected limb.



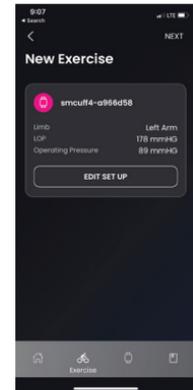
- 3 Select a pressure mode. *Manual mode is only available in Health Professional accounts.*



- 4 Select Exercise mode.



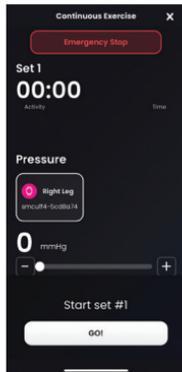
- 5 Tap "Next" in the top right corner of the screen.



# DEVICE OPERATION

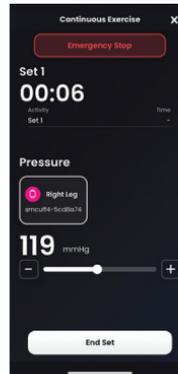
## EXERCISE

- 1 Tap “Go” to inflate.

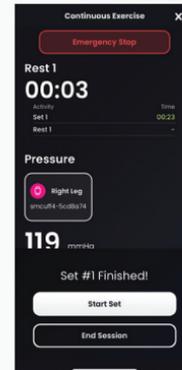


- 2 Begin exercise.
- 3 You can increase (+) or decrease (-) as needed during exercise.

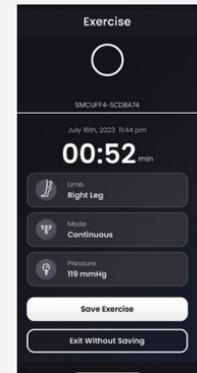
- 4 When finished with your set, tap “End Set”. *You might hear the cuff inflate and that is by design. It ensures proper pressure at the beginning of each set.*



- 5 When you are finished exercising, tap “End Session”.



- 6 We recommend that you “Save Exercise” for future sessions.



# CHARGING AND OTA PROCEDURES

## CHARGING

To charge, simply plug the charging cord into the USB-C port. Within 1 min, the center light will turn solid RED or GREEN. RED means the battery is less 100% and it is charging. GREEN means battery level has reached 100%.

## FIRMWARE UPDATE

Please note, this is not updating the app software. That is done on your phone. This is updating the actual operating system on the SmartCuffs device. You can update the firmware on the individual devices 1 of 2 ways:

### Via the app

- » Follow the onscreen instructions on the app (yellow box on the home screen of the app will prompt you)
- » This method can only update one unit at time and can take up to 20 minutes

### Mesh OTA (over-the-air)

- » This is the most time efficient method as it will update the firmware on all units at the same time.
- » OTA update one unit via the app. Then plug all devices into power and within 1ft of one another. This is required for mesh OTA to work. **NOTE: You do not need to anything other than plug them into power. The device will do all the work.**
- » When two devices are upgrading each other via flash mesh:
  - » **the sender:** center LED solid orange - blinking green power button
  - » **the receiver:** center LED blinking orange - all button LEDs are off
- » Updates one unit at a time
- » If doesn't start updating one unit within 10 seconds, turn the most updated unit off and back on it again.
- » When there is no more devices to upgrade, center LED goes back to indicate battery charge - RED charging, GREEN charged

# TROUBLESHOOTING

**TIMEOUT ERRORS AND LEAKING ISSUES:** There is a smooth bump underneath the pump. These are the ports. Press firmly into those with your thumbs. You should hear a squeaking/crackling noise. If you do, then the ports were loose and they simply needed tightening.

**LOP ERRORS:** Body position and cuff size are main culprits of LOP errors. Make sure the pump is on the outside of the limb and there is some overlap of the cuff (1–4 inches). No gaps should be present. Body position is also very important. Any movement will throw off the pressure sensor and give a false reading. If this is difficult to achieve, we recommend the supine position (on your back laying down) is best. Thick clothing (jeans, pajamas, sweatpants, etc.) can affect readings. It is best to use the cuffs directly on skin or thin clothing.

**HIGH OR LOW LOP PRESSURES:** Proper cuff sizing is vitally important and the number one culprit of excessively high or low pressures. If properly fitted, the cuff should have an overlap of 1–4 inches. Any gaps in the enclosure of the cuff around the limb will lead to unnecessary high pressure and pinching of the skin. All of which can be avoided with proper sizing.

**BLUETOOTH CONNECTION (BLE):** If BLE signal is lost for any reason, close out the app and power off the device to reset everything. Then try to connect again. Note: There's a 10 foot range limit on the app.

**SERVER ISSUE NOTIFICATION:** Refresh app.

# EXERCISE PRESCRIPTION



## STRENGTH AND HYPERTROPHY

Establish the ability to perform 30 repetitions of an exercise PRIOR to applying occlusion. This will equate to about 20% of your 1RM to start. See **Appendix 1** for establishing your 1RM estimate. You do not want to exercise to failure (inability to complete all repetitions).

## THREE WHOLE BODY EXERCISES

**HIP HINGE OR SQUAT  
VARIATION**

(ie. Deadlift or Barbell Squat)

+

**UPPER BODY  
PUSH**

(ie. Benchpress)

+

**UPPER BODY  
PULL**

(ie. Lat Pulldown)

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THEN

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## TWO ISOLATED EXERCISES

(ie. Bicep Curl, Tricep Pushdown, Hamstring Curl, Quad Extension)

### A SET OF BFR EXERCISES IS PERFORMED BY:

- » **PERFORMING 30 REPETITIONS** (not to failure!). *This should not be too difficult to complete.*
- » Resting for 30–60 seconds
- » **PERFORMING 15 REPETITIONS** (not to failure!). *This should be a little difficult.*
- » Resting for 30–60 seconds
- » **PERFORMING 15 REPETITIONS** (not to failure!). *This should be a little more difficult.*
- » Resting for 30–60 seconds
- » **PERFORMING 15 REPETITIONS** (not to failure!). *This should be very difficult.*
- » Go to next exercise (ie. resting for 30–60 seconds)

# EXERCISE PRESCRIPTION



## AEROBIC CONDITIONING

Establish your Heart Rate Reserve (HRR)  
(see **Appendix 1**).

Work on treadmill, rower, bike, stair stepper, etc. at 30% HRR to start and increase intensity by 10% each week. More fit individuals can start at 45% of HRR will need to increase the intensity by 10% each week (up to 60% HRR).

*20 minutes maximum cuff inflation is recommended for safe training.*

## APPENDIX 1

# BFR WORKSHEET

## HEART RATE RESERVE (HRR)

Resting Heart Rate (before out of bed is best):

$$\text{Max HR} = 220 - \text{age} = 220 - (\text{age}) = \text{HRMax}$$

$$\text{Max HR} - \text{Resting HR} = \text{HR Reserve (HRR)}$$

$$. \text{HRR} \times .30 + \text{HRRest} = \text{Training Target}$$

$$((\text{HRR} \times (.30)\text{Training Intensity\%})) + \text{Resting HR} = \text{Target HR}$$

*\*Trained individuals start at 45% HRR and work up to 60%*

*\*\*Untrained start at 30% HRR and work up to 60%*

## 1-REPETITION MAXIMUM (1RM)

Number of Repetitions	Percent of 1RM		Weight Lifted
1	100	X	1.00
2	95	X	1.05
3	93	X	1.08
4	90	X	1.11
5	87	X	1.15
6	85	X	1.18
7	83	X	1.2
8	80	X	1.25
9	77	X	1.3
10	75	X	1.33
11	70	X	1.43
12	67	X	1.49
15	65	X	1.54

### ESTIMATE 1RM EXAMPLE

10 RM Test: 100 lbs

$100 \times 1.33 = 133$  lbs Estimated 1RM

$133 \times .20 = 26.6$  lbs

$133 \times .35 = 46.55$  lbs

BFR Training Intensity = **27 lbs–47 lbs**

### SUMMARY

Perform 3–4 warm-up sets prior to your best effort

Reach your 5-rep maximum or 10-rep maximum

Multiply by the respective number to estimate your 1RM

Multiply estimated 1-RM by 0.20 or 0.35 (for training intensity of 20 to 35 percent)



SMART  CUFFS

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