



2022 NSCA *NATIONAL* CONFERENCE

July 6-9, 2022 | New Orleans & Online
#NSCACon22

› *KNOWLEDGE*
› *ADVANCEMENT*
› *COMMUNITY*

CONFLICT OF INTEREST STATEMENT

I have no actual or potential conflict of interest
in relation to this presentation.

ACKNOWLEDGEMENTS





Hitting “Reset” with Floatation Therapy: Exploring the Mind/Body Benefits for Athletes

OUTLINE FOR TODAY'S TALK

EXPLORING THE MIND/BODY BENEFITS OF FLOATATION THERAPY

- Discuss the importance of proper recovery in optimizing performance
- Describe what is floatation therapy
- Examine the **scientific evidence** surrounding the use of floatation therapy in athletic performance and recovery?
- Provide the results of our first laboratory-controlled studies in float recovery and tips for promoting in tank relaxation
- Identify future directions for float interventions and research

RECOVERY

Restoration of Physiological and Psychological Processes



Fatigue, Muscle Tension, Headaches and GI Discomfort

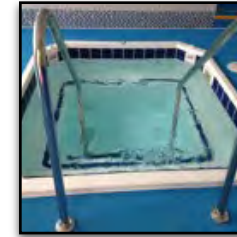
Changes in Sleep Patterns and Appetite

Decreased Motivation, Increased Anxiety and Self-Doubt



↓ PHYSICAL AND MENTAL PERFORMANCE
↑ RISK OF INJURY AND ILLNESS

RECOVERY



PERFORMANCE



U.S. AIR FORCE



What is Flotation-Therapy?



Sterile water saturated with magnesium sulfate (Epsom Salt) increases the density of the water from 1.0 to 1.25 g/cm³ allowing the body to float effortlessly

*Roughly 800-1,200 lbs of salt
in an average float tank*

Eyes, nose and mouth remain above the surface of the water, allowing for natural breathing

What is Flotation-Therapy?



What is Flotation-Therapy?



What is Flotation-Therapy?

AUDITORY

Isolated room,
fiberglass shell,
earplugs

VISUAL

Light input is
removed

GRAVITATIONAL

Water density
provides
buoyancy

THERMAL

Water is
heated to skin
temperature,
95°F



TACTILE

Arms are placed at
side surrounded
by water,
float nude

VESTIBULAR AND PROPRIOCEPTIVE SYSTEMS

Lying still, no coordinated body movement

Suggested Benefits of Float Therapy

1. Managing negative stress symptoms through relaxation
2. Mental preparation of the athlete (imagery)
3. Physical recovery

Review of the Scientific Literature

Early investigations focused on demonstrating physical relaxation

Turner and Fine, 1983

- n = 12 healthy males
- Four 35-minute flotation-REST sessions vs control
- Significant reduction in cortisol and ACTH

Turner and Fine, 1989

- n = 21 healthy adults
- Eight 40-minute flotation-Rest sessions
- Significant reduction in cortisol

Turner and Fine, 1991

- n = 27 healthy adults
- Eight, 40-minute flotation-REST sessions vs control
- Significantly reduced cortisol concentration and variability

Reductions in HPA signaling

Review of the Scientific Literature

34 Studies

HEALTHY ADULTS

- o Improved stress biomarkers
 - ↓ blood pressure,
 - ↓ cortisol,
 - ↓ catecholamine metabolites
- o Increased in creativity
- o Improved pain
- o Improved mood state
 - ↓ Anxiety,
 - ↓ Depression,
 - ↓ Stress,
 - ↑ Optimism

10 Studies

PAIN-FOCUSED

- o Improved pain characteristics
 - ↓ pain intensity
 - ↓ pain frequency
 - ↓ pain areas
- o Decreased medication
- o Improved coping strategies
- o Improved mood state
 - ↓ Anxiety,
 - ↓ Depression,
 - ↓ Stress,
 - ↑ Optimism

8 Studies

PSYCHOLOGICAL

- o Improved sleep
- o Self-regulatory behavior
 - ↑ Self-awareness
 - ↑ emotion regulation
- o Physical improvements
 - ↓ muscle tension
 - ↓ pain
- o Improved mood state
 - ↓ Anxiety
 - ↓ Depression
 - ↑ Optimism

Review of the Scientific Literature

34 Studies

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Review of the Scientific Literature

PERFORMANCE POPULATIONS

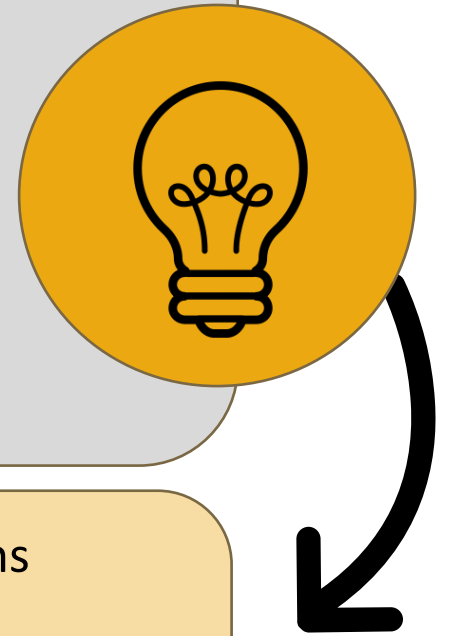
REFERENCE	SIZE	POPULATION	SESSIONS
Lee and Hewitt, 1987	N = 37	Gymnasts	6
Suedfeld and Bruno, 1990	N = 30	Basketball Players	1
McAleney et al., 1990	N = 20	Collegiate Tennis Players	6
Wagaman, 1991	N = 22	Collegiate Basketball Players	6
Suedfeld et al., 1993	N = 40	Adult Dart Players	1
Norlander, 1999	N = 20	Junior Level Archers	1
Vartanian and Suedfeld, 2011	N = 13	Jazz Students	4
Klockare et al., 2015	N = 6	Track and Field Athletes	2 to 6
Driller et al., 2016	N = 60	Mixed Elite Athletes	1
Borjesson et al., 2018	N = 30	Golfers	1

Focused on mental preparation and reducing anxiety and arousal prior to competition

Review of the Scientific Literature

Morgan PM, et al. *JSCR*, 27(12): 3467 – 3474

- N = 24 healthy untrained males
- Randomized crossover-controlled study
- 1-hour flotation-REST vs seated control
- Single joint eccentric protocol
 - 50 knee flexion and extensions at $60^{\circ} \text{ s}^{-1}$
- Measured lactate, pain, soreness, strength over 48 HR
 - Significant reduction in blood lactate
 - Significant reduction in perceived pain



Assess recovery potential of flotation-REST in high performance populations

1. Use of a trained population
2. Stress model that incites significant metabolic, adrenergic and mechanical stress
3. Evaluation of a diverse set of recovery biomarkers

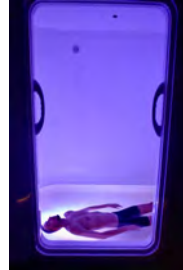
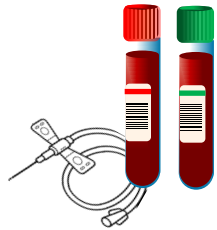
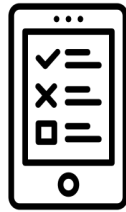
Characterizing the First Float Exposure: Is the Initial Experience Relaxing or does it Require Practice?

PARTICIPANT CHARACTERISTICS AND METHODOLOGY:



N = 14 MALES

Age: 21.3 ± 6.3 years
Height: 175.2 ± 6.1 cm
Weight: 86.1 ± 10.1 kg



MEASUREMENTS TAKEN PRE & POST 60-MINUTE FLOAT EXPOSURE

- Short Form Profile of Mood States (POMS)
- Positive and Negative Affect Schedule (PANAS)
- Lee Fatigue Scale (LFS) & VAS for Pain and Soreness

- Cortisol
- Epinephrine
- Norepinephrine

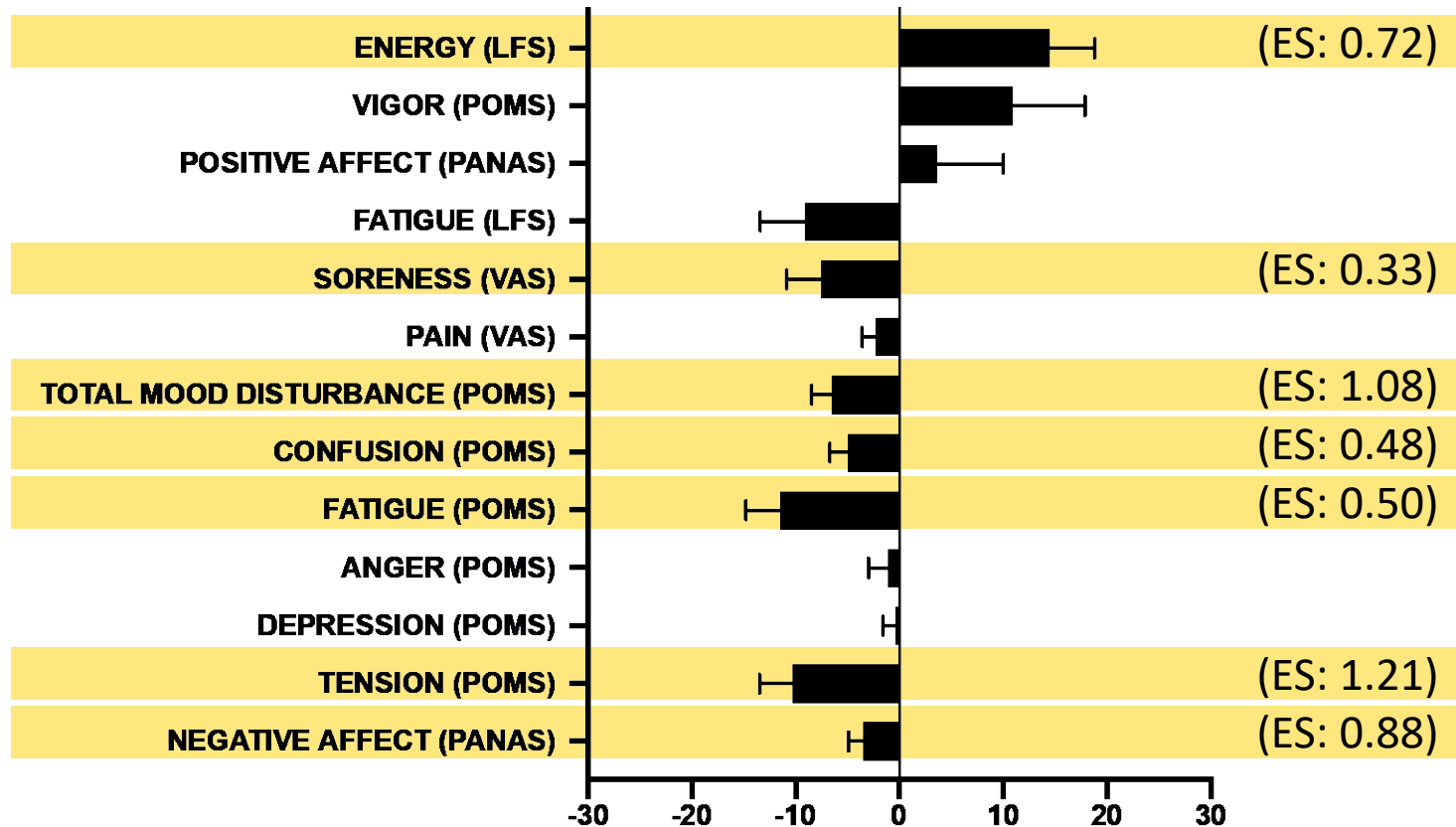
POST FLOAT INTERVIEW

A semi-structured interview was used to capture the first float exposure with greater depth and detail

Caldwell LK, *et al.* (2021). J Strength Con Res, 32(12): e318-e319

FIRST FLOAT EXPOSURE

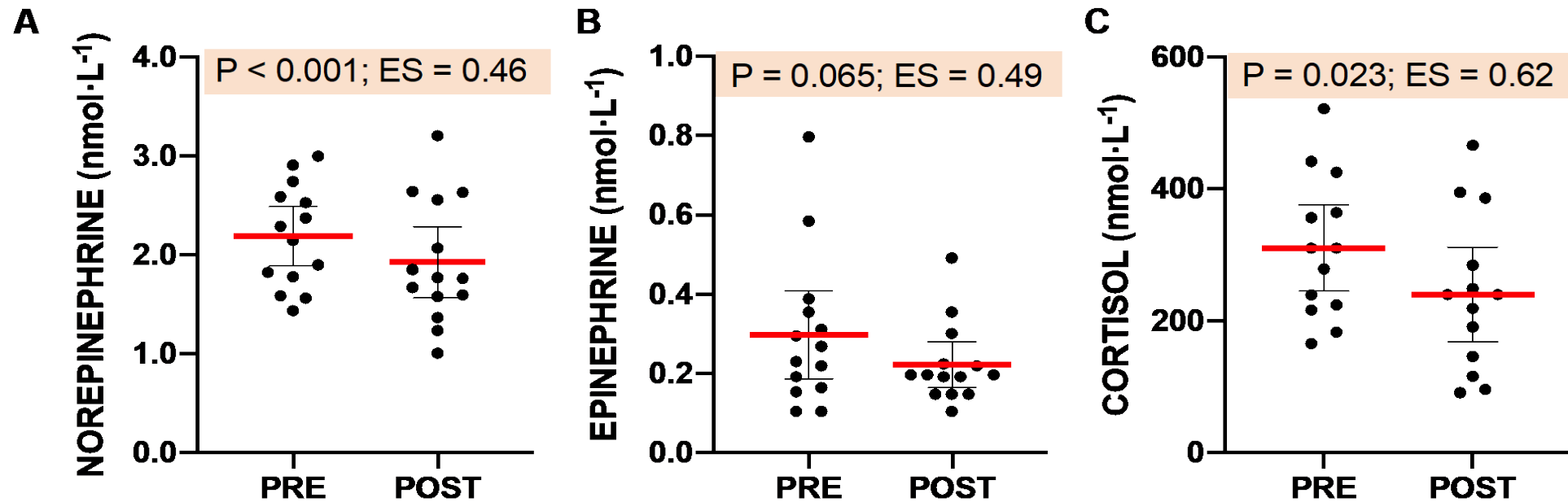
PSYCHOMETRIC DATA (N = 14)



Caldwell LK, *et al.* (2021). J Strength Con Res, 32(12): e318-e319

FIRST FLOAT EXPOSURE

STRESS HORMONES (N = 14)



Caldwell LK, *et al.* (2021). J Strength Con Res, 32(12): e318-e319

FIRST FLOAT EXPOSURE

POST FLOAT INTERVIEW (N = 14)

INITIAL ACCLIMATION

- 1) Position Arms/Neck
 - 2) Stay Centered
 - 3) Adjust to Darkness
- 36% Expressed Apprehension

PROBLEMS

- 3 Salt in Eye
- 2 Earplug Issues

IN TANK EXPERIENCE

- Interoceptive Awareness
- Thought Provoking vs. Mind Wandering vs. Absence of Thought
- 40% Awake, 27% Slept, 33% Unsure

PHYSICAL

- "Looser, Not as Tense, Lighter, Relaxed, Fluid, Less Fatigued"
- Less Sore, Less Pain

MENTAL

- "Relaxing, Calming, Restorative"
- Comparison to Meditation
 - Alert, More Energy

Caldwell LK, *et al.* (2021). J Strength Con Res, 32(12): e318-e319

After a **single** 60-minute float session, **novice floaters** demonstrated significant improvement in stress-related symptomology:

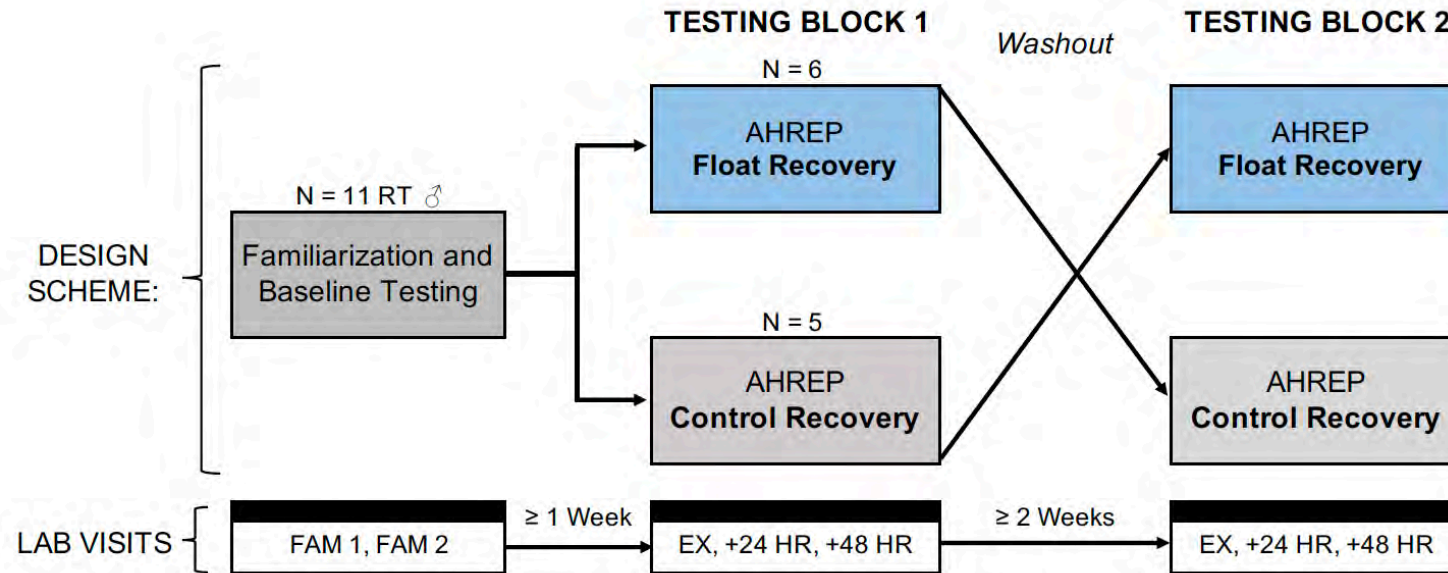
Cortisol ↓ **23%**
Soreness ↓ **57%**

Energy ↑ **57%**
Fatigue ↓ **27%**

While overall viewed as a positive experience, initial feelings of discomfort highlight the importance of familiarization in reducing barriers to relaxation

Caldwell LK, et al. (2021). J Strength Con Res, 32(12): e318-e319

EXERCISE RECOVERY IN TRAINED INDIVIDUALS



Caldwell, LK *et al* (2022). Med Sci Sports Exerc, Online ahead of print

DESIGN CONTROLS

- 6 AM Start Time
- Fasted State
- No Exercise 72 HR Before Visit
- Hydration Check (USG < 1.020)
- 3-Day Diet Replication
- Nothing to Enhance Speed of Recovery

EXPERIMENTAL DESIGN

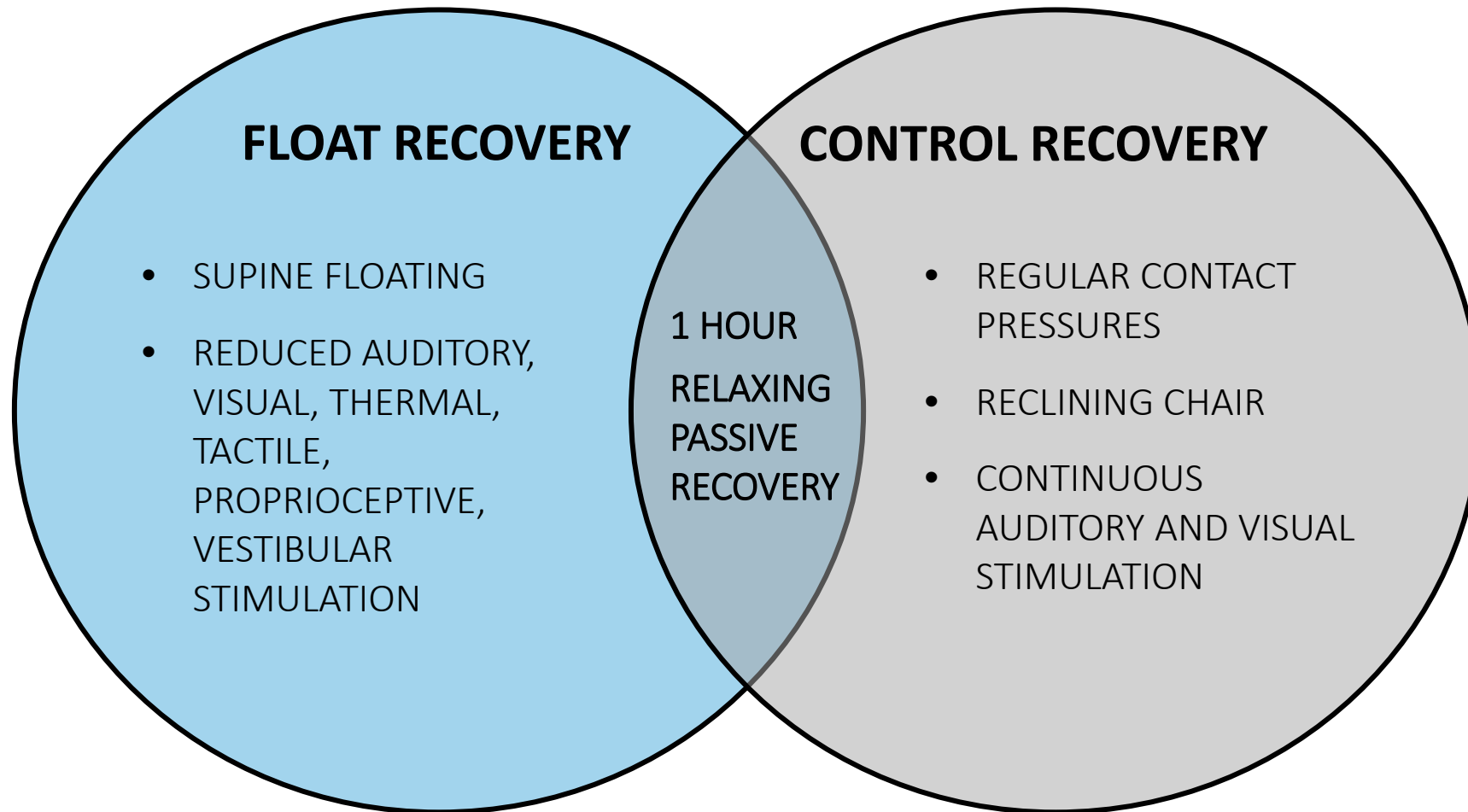


6 X 10 BACK SQUAT
2 MIN REST
STARTING LOAD: 80% 1 RM

If spotter assistance was required, the weight was ↓10% on the following set

Peak HR and RPE recorded each set

Two Passive Recovery Conditions Divergent in Sensory Stimulation



DEPENDENT VARIABLES



Metabolic Stress

Blood Lactate; *Blood Draw*



Neuroendocrine Signaling

Epinephrine, Norepinephrine, Cortisol, Testosterone; *Blood Draw*



Inflammation

TNF-Alpha, IL-6; *Blood Draw*



Structural Damage

Myoglobin, Creatine Kinase; *Blood Draw*



Muscular Performance

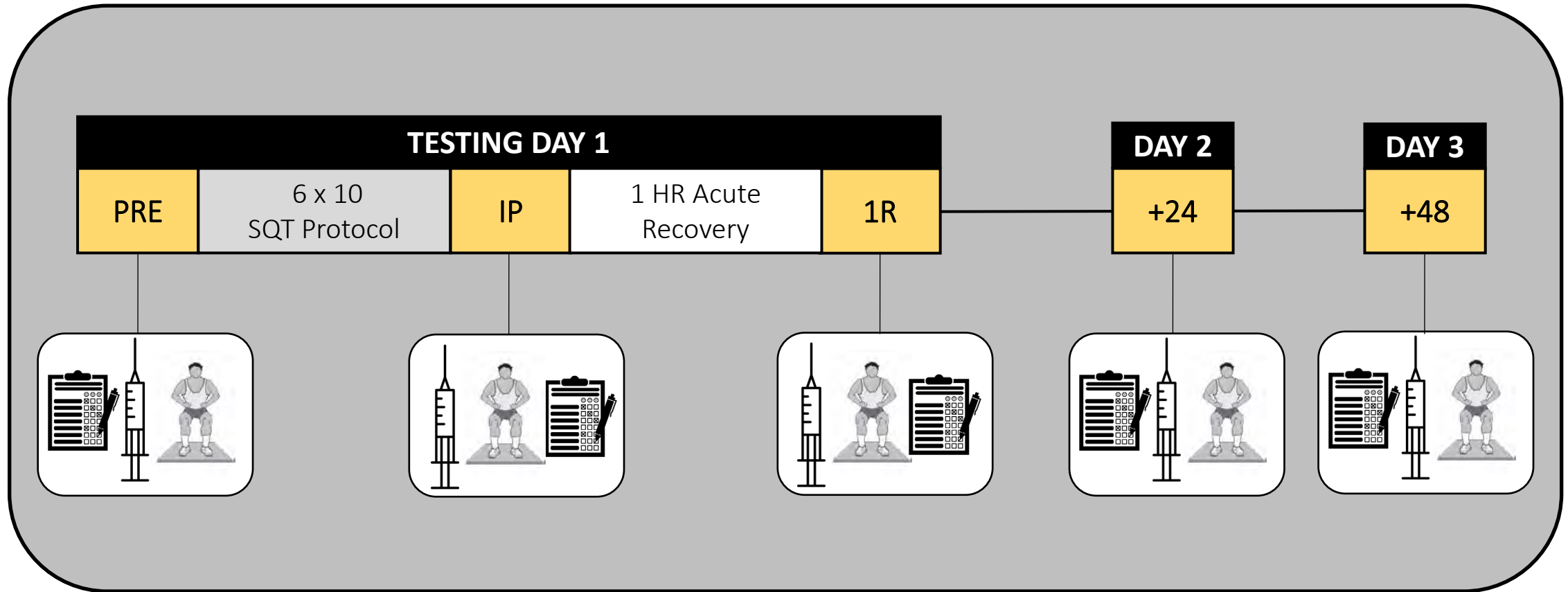
Squat Jump and Countermovement Jump; *Force Plate*



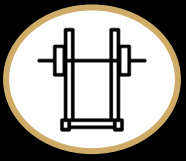
Perceptions

Pain, Soreness, Mood, Fatigue; *VAS, PANAS, POMS-SF*

DEPENDENT VARIABLES



Caldwell, LK *et al* (2022). Med Sci Sports Exerc, Online ahead of print



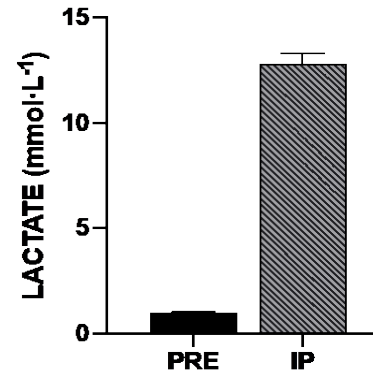
ACUTE RESISTANCE EXERCISE

6 X 10 CHARACTERISTICS

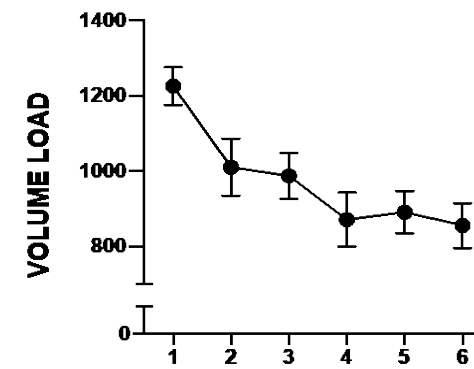
STRESS MODEL

- ✓ METABOLIC
- ✓ ADRENERGIC
- ✓ MECHANICAL

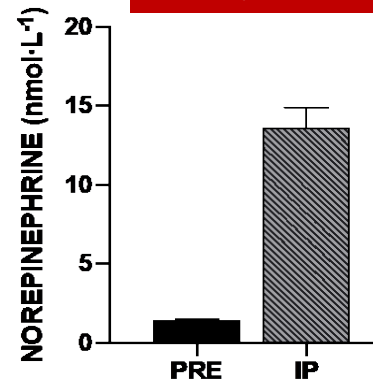
12.9 - FOLD



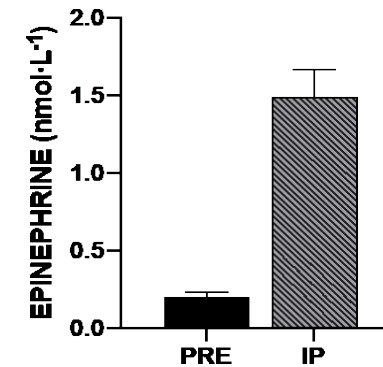
5,838 ± 290 KG



9.7 - FOLD



7.2 - FOLD



Caldwell, LK *et al* (2022). Med Sci Sports Exerc, Online ahead of print

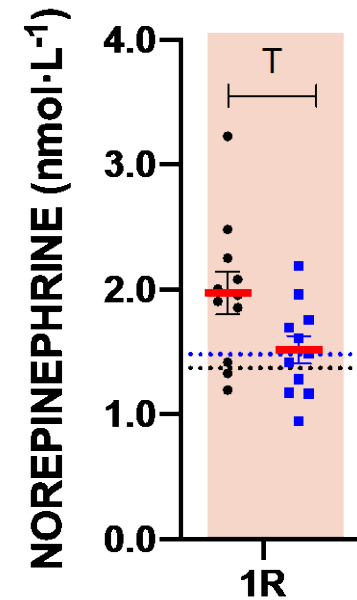
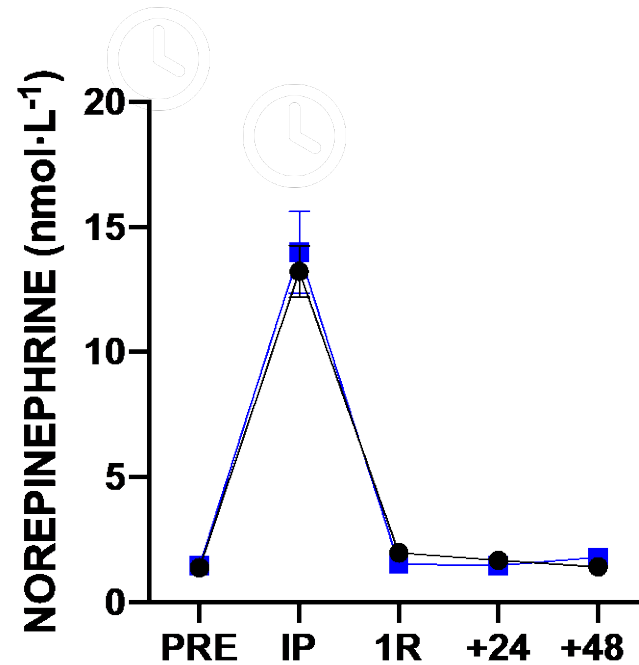
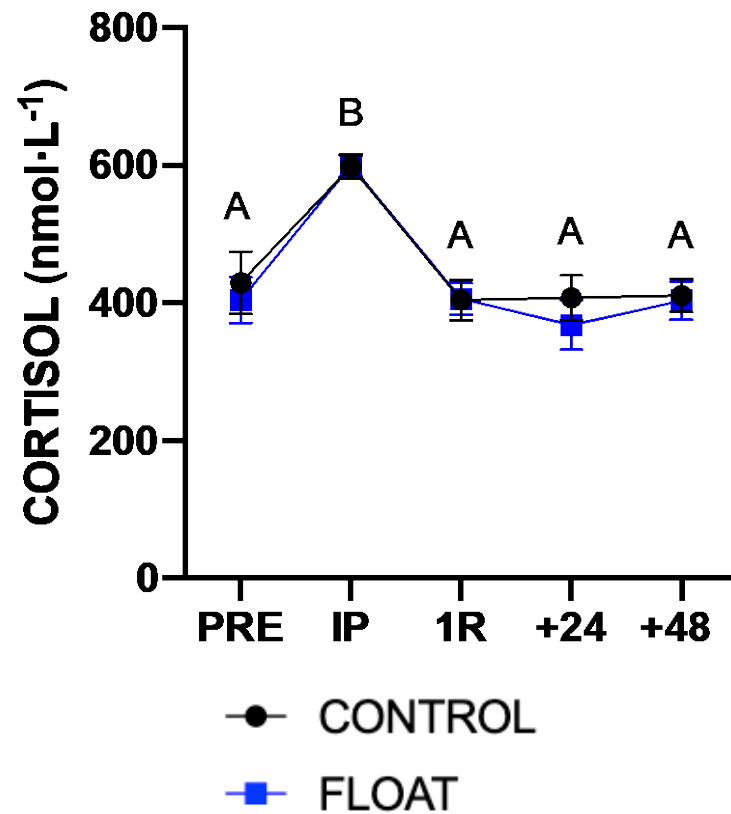


NEUROENDOCRINE SIGNALING

STRESS SIGNALLING PATHWAYS



Different from Float
Changes without
Exercise !!

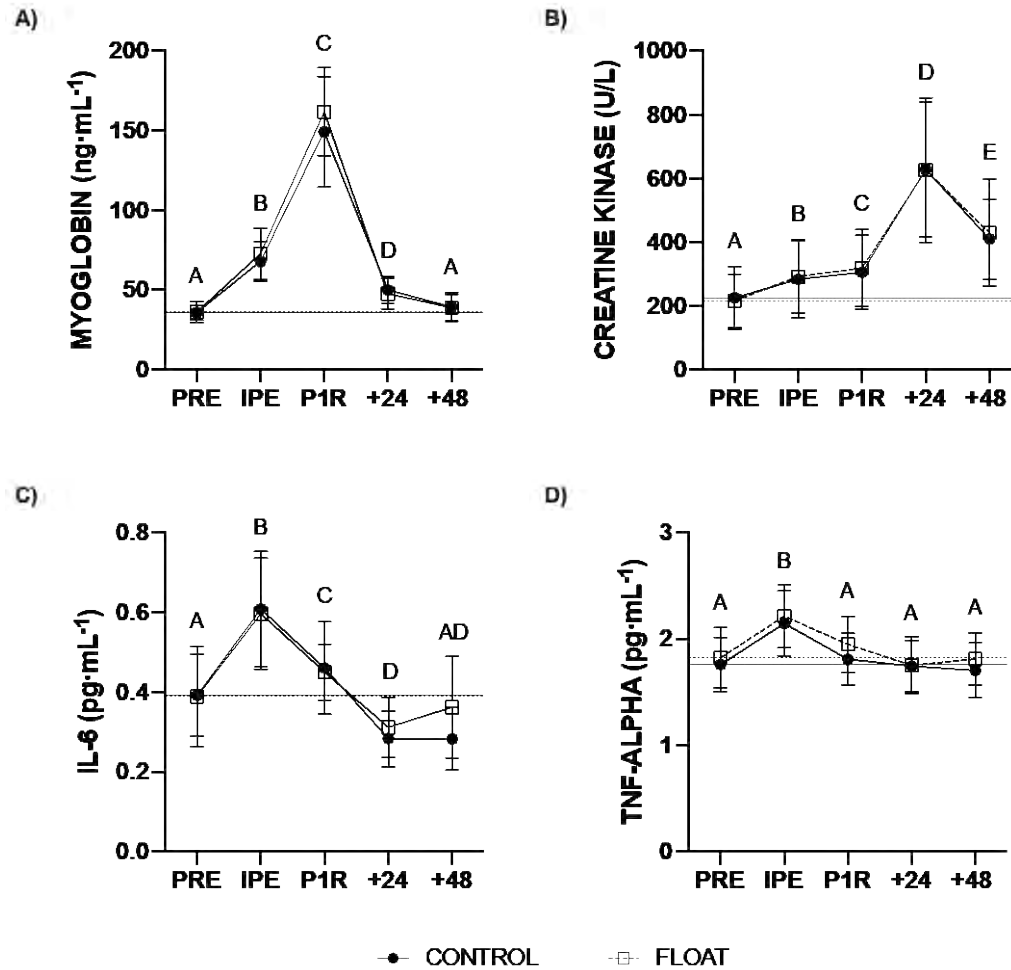


Caldwell, LK *et al* (2022). Med Sci Sports Exerc, Online ahead of print



MUSCLE DAMAGE AND INFLAMMATION

MB, CK, IL-6, TNF-ALPHA

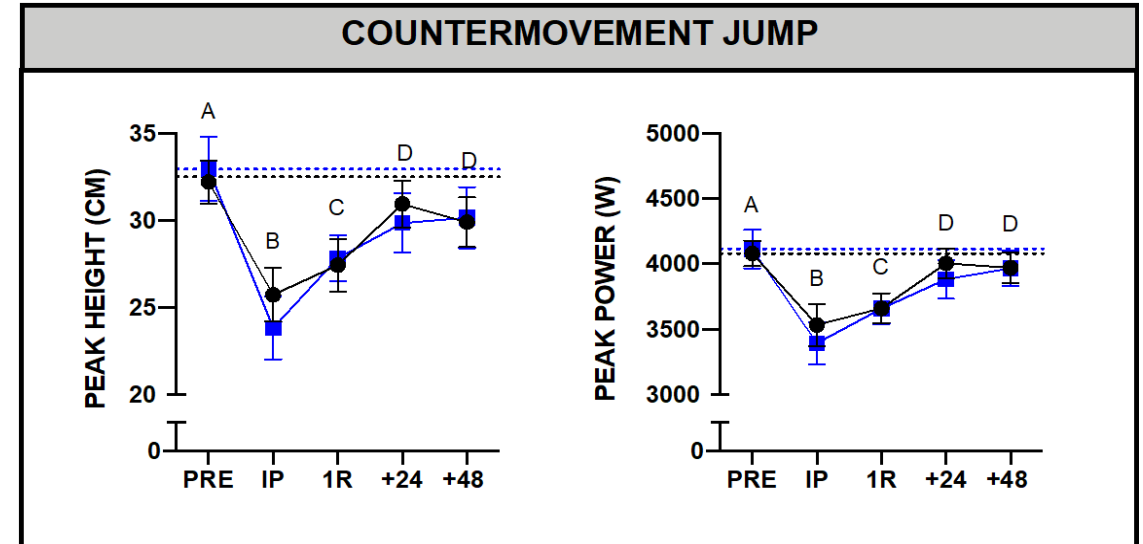
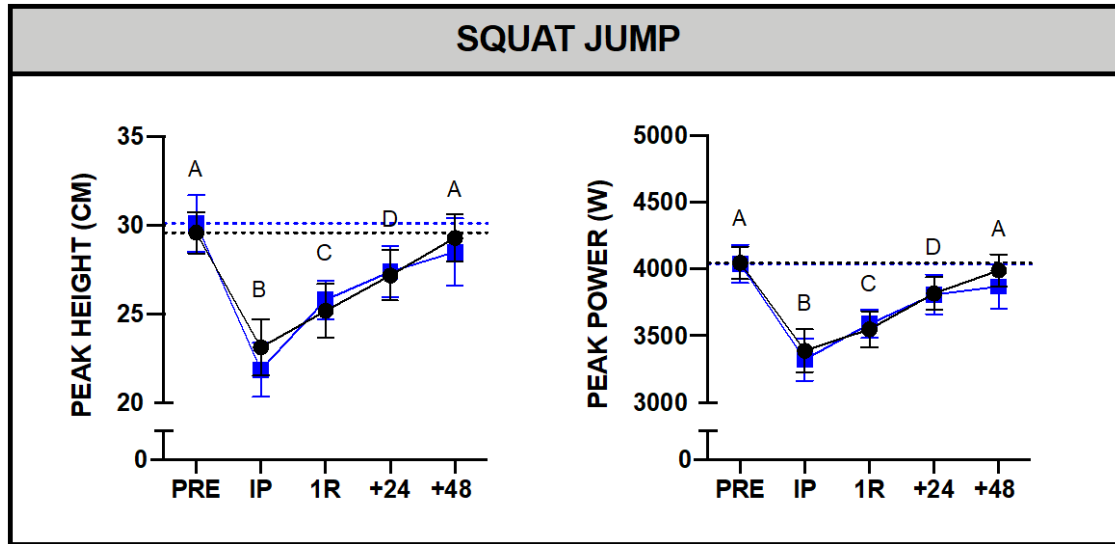


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MUSCULAR PERFORMANCE

SQUAT AND COUNTERMOVEMENT JUMP

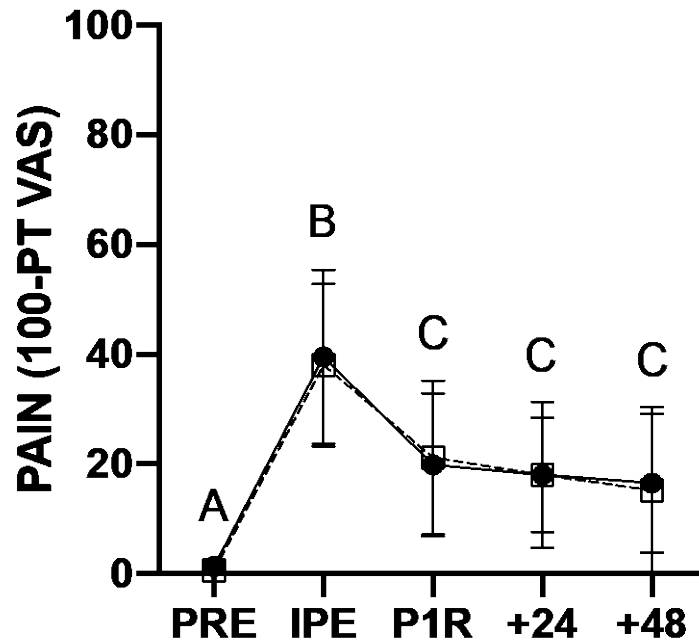


Caldwell, LK *et al* (2022). Med Sci Sports Exerc, Online ahead of print

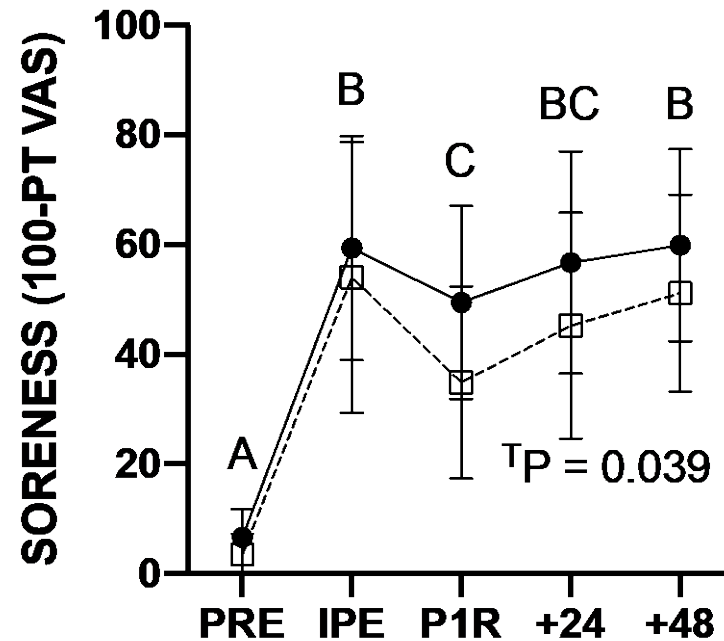


PSYCHOLOGICAL PERCEPTIONS

PAIN AND MUSCLE SORENESS



● CONTROL □ FLOAT



TREATMENT EFFECT

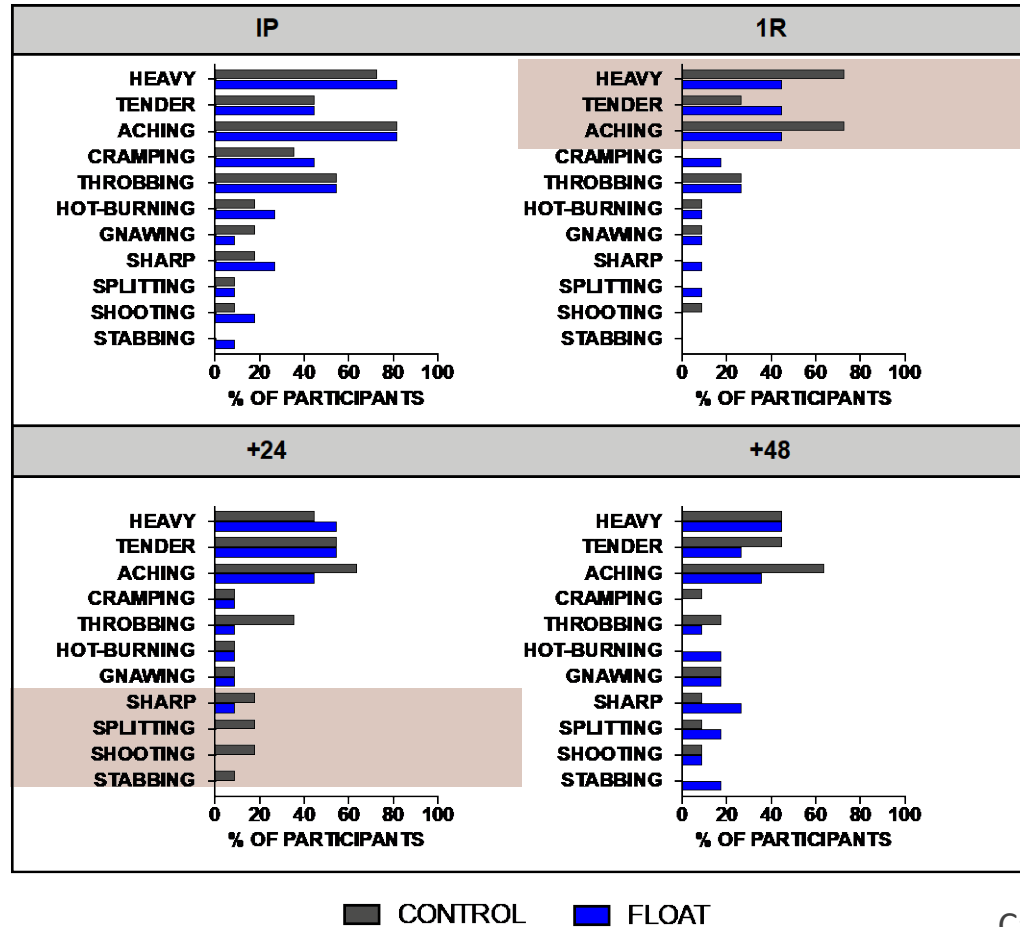
SORENESS:
FLOAT < CONTROL

Caldwell, LK *et al* (2022). Med Sci Sports Exerc, Online ahead of print



PSYCHOLOGICAL PERCEPTIONS

SENSORY PAIN CHARACTERISTICS



IP
Similar

1R
45% vs 73%
Heavy, Aching Pain

+24
Less severe pain
characteristics

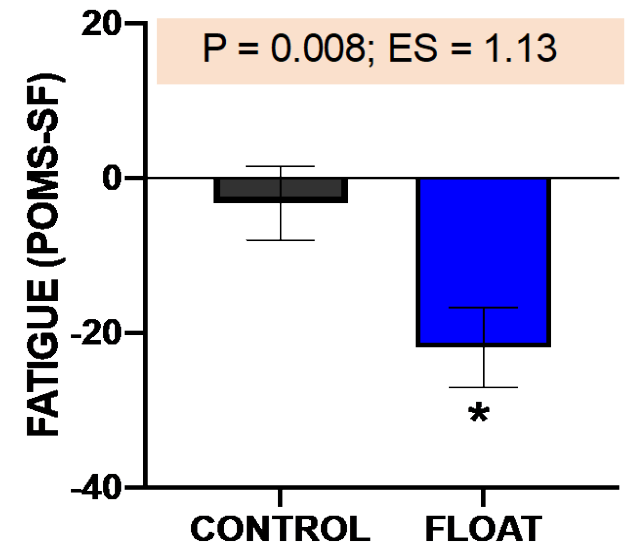
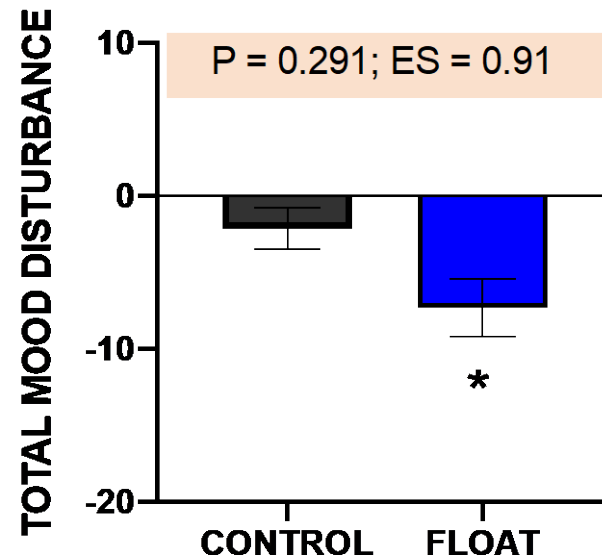
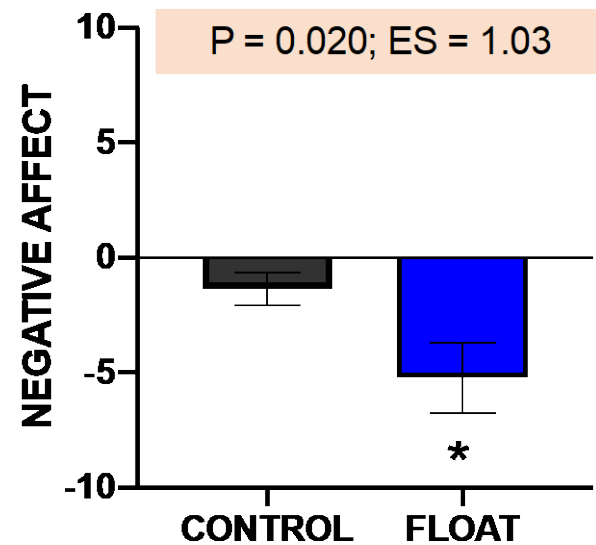
+48
Similar

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PSYCHOLOGICAL PERCEPTIONS

MOOD STATE AND FATIGUE

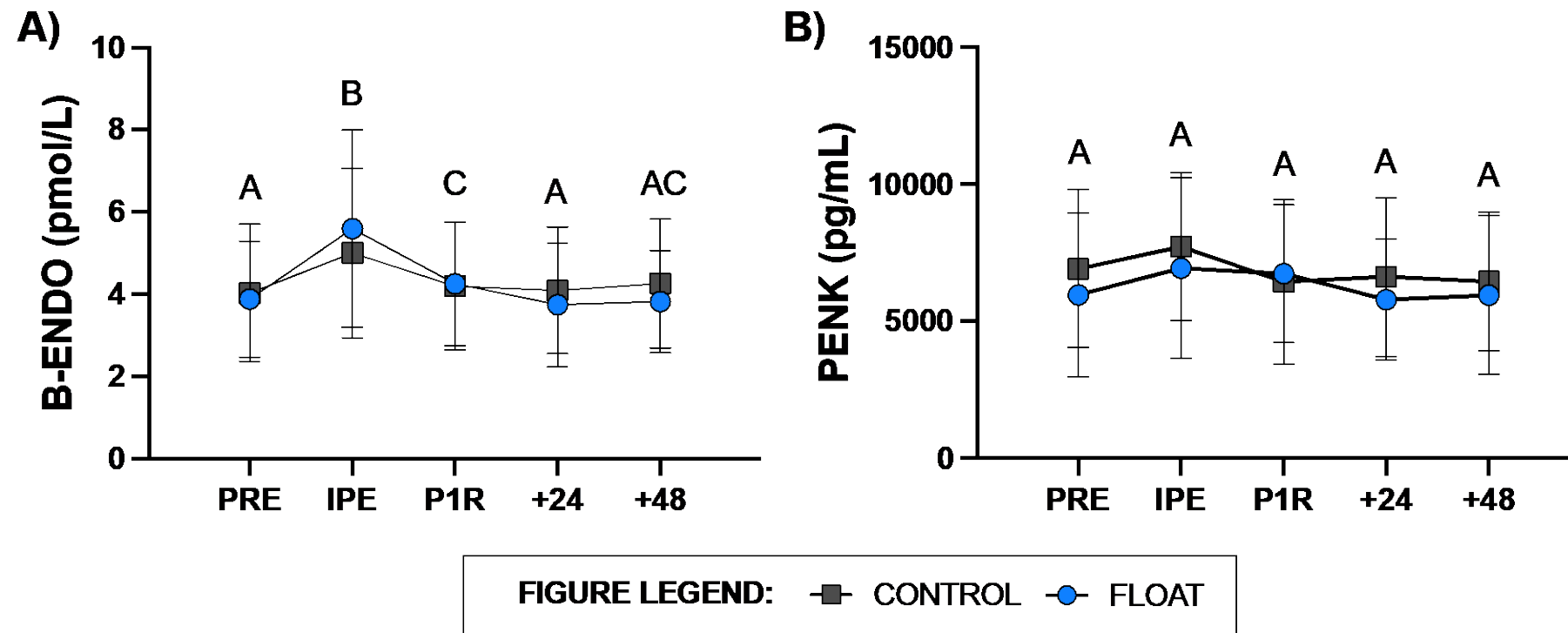


Caldwell, LK *et al* (2022). Med Sci Sports Exerc, Online ahead of print



PSYCHOLOGICAL PERCEPTIONS

Mechanism: Opioid Peptides?



Caldwell, LK *et al* (2022). ACSM National Conference

Major Take Away Message

- A 60-minute float **immediately following** intense-muscle damaging exercise improved muscle soreness, mood state and fatigue in resistance trained men.
- Significant alterations in norepinephrine and total testosterone following treatment indicate modification of neuroendocrine signaling pathways.
- The treatment **DID NOT** alter measures of structural damage or inflammation which *may suggest* the suitability of the treatment for **regular management** of stress, soreness and fatigue.

Just the Beginning

- What happens when float is delivered at a different stage in the recovery process?
- What happens with a more chronic exposure scheme?
- How does float affect symptoms of chronic stress?
- How does float affect the recovery domains in a different exercise paradigm—possibly one with less underlying muscle damage?

DOUBLE ISSUE

JULY 19 / JULY 26, 2021



TIME

**'IT'S O.K.
TO NOT
BE O.K.'**

NAOMI OSAKA

ON HER FIRST OLYMPICS,
PRIORITIZING MENTAL
HEALTH AND WHY SPORTS
NEEDS TO CHANGE—NOW

THE 40 MUST-WATCH
OLYMPIANS

time.com



TIME . July 19 2021. Photograph by Williams & Hirakawa—AUGUST

Thank You!

Questions?