

THE RECOVERY - STRESS STATE



Flotation-REST: Restricted Environmental Stimulation Technique

REST environments drastically reduce environmental stimulus

- **Light** minimization (low level LED if desired for comfort)
- **Sound** minimization (relaxing 'spa music' if desired)
- **Temperature**: Water and ambient air = skin temperature
- **GRAVITY** minimization: >900 pounds of Epsom salt for complete flotation



Flotation Therapy - Mechanisms

RECOVER

<http://time.com/floating/>



Central effects of flotation therapy explored using functional neuroimaging



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Methods: 40 healthy participants underwent a baseline fMRI brain scan prior to being randomized into one of two conditions: flotation therapy or an active comparison condition. Each condition had participants float supine for 90 min on three separate occasions. Immediately following the 3rd float session, participants underwent a second brain scan. During each brain scan, four separate tasks were conducted and analyses assessed for Group X Time interactions ($p < .05$) during resting state functional connectivity, interoceptive attention, as well as emotion and reward processing.

Results: In relation to the active comparison condition, flotation therapy significantly increased subjective levels of serenity and relaxation while decreasing feelings of stress and anxiety. Moreover, rather than depriving the senses, it was found that flotation therapy significantly enhanced interoceptive sensations, especially for the heartbeat and the breath. The degree of internal sensory enhancement experienced while floating was highly correlated with activation in the insular cortices during a visceral interoceptive attention task.

Conclusions: Flotation therapy appears to increase interoceptive awareness and subjective relaxation, while decreasing both stress and anxiety. These preliminary fMRI results suggest that the internal sensory enhancement experienced while floating is related to activation changes in the insular cortices. Future work aims to explore whether these neural changes are evident in clinical populations with anxiety.

Eliciting the Relaxation Response With the Help of Flotation-REST (Restricted Environmental Stimulation Technique) in Patients With Stress-Related Ailments

Sven Å. Bood, Ulf Sundequist, Anette Kjellgren, and Torsten Norlander
Karlstad University

*This study aimed to investigate long-term effects of the flotation-REST (restricted environmental stimulation technique) 4 months after treatment. **Seventy patients, 54 women and 16 men**, participated, diagnosed as having stress-related pain. Twenty-six participants had also the diagnosis of burnout depression. Participants were randomly assigned in equal numbers to either a control group or a flotation-REST group and participated in a **total of 12 flotation-REST or control sessions**. **Results indicated that pain areas, stress, anxiety, and depression decreased, whereas sleep quality, optimism, and prolactin increased. Positive effects generally maintained 4 months after treatment, but prolactin returned to initial levels. It was concluded that flotation tank therapy is an effective method for the treatment of stress-related pain.***

Flotation Therapy - Chronic Pain



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Table 2. Means and (Standard Deviations) for Sleep Quality (Sleep) and Dispositional Optimism (Optimism) Before and After Control or Flotation Treatment (Time 1–2) With Regard to Group (Control, Flotation–REST) and Diagnosis (Nondepressed, Depressed)

Variable	Control		Flotation–REST		Time
	Nondepressed	Depressed	Nondepressed	Depressed	Before & After
Sleep 1	51.89 (26.27)	61.27 (16.88)	46.71 (24.23)	34.00 (15.92)	49.28 (23.47)
Sleep 2	56.53 (22.79)	55.53 (21.43)	59.04 (22.65)#	42.82 (30.7)#	55.00 (23.86)
Optimism 1	21.89 (4.05)	23.07 (4.53)	20.63 (3.97)	16.73 (5.53)	20.88 (4.75)
Optimism 2	22.42 (4.54)	22.13 (4.36)	21.88 (4.12)#	19.09 (5.03)#	21.64 (4.49)

Note. Significant interaction effect for Time \times Group ($p < .05$) is indicated in the Flotation–REST and After conditions with #.

Table 3. Means and (Standard Deviations) for Stress, Energy, Anxiety, Depression Before and After Control or Flotation Treatment (Time 1–2) With Regard to Group (Control, Flotation–REST) and Diagnosis (Nondepressed, Depressed)

Variable	Control		Flotation–REST		Time
	Nondepressed	Depressed	Nondepressed	Depressed	Before & After
Stress 1	2.04 (0.87)	2.14 (1.10)	2.19 (1.01)	2.83 (0.85)	2.24 (0.98)
Stress 2	1.94 (0.95)	2.03 (0.71)	1.51 (0.99)#	1.95 (1.15)#	1.80 (0.97)*
Energy 1	3.30 (1.02)	3.12 (1.20)	3.11 (0.81)	2.77 (0.96)	3.11 (0.98)
Energy 2	3.11 (0.99)	3.23 (0.87)	3.15 (0.78)	2.83 (0.64)	3.10 (0.83)
Anxiety 1	7.74 (3.48)	6.80 (2.98)	7.00 (3.62)	10.91 (3.65)	7.78 (3.67)
Anxiety 2	7.26 (4.20)	8.73 (7.52)	5.48 (3.27)#	7.18 (3.63)#	6.93 (4.82)
Depress 1	3.79 (3.34)	5.13 (3.16)	4.08 (2.89)	10.09 (4.99)	5.19 (4.04)
Depress 2	3.47 (3.01)	5.47 (4.84)	3.24 (2.67)#	6.18 (3.43)#	4.24 (3.57)*

Note. Significant effects for Time ($p < .05$) are indicated in the After conditions with *. Significant interaction effect for Time \times Group ($p < 0.05$) is indicated in the Flotation–REST and After conditions with #.

Float therapy significantly reduced pain, stress, anxiety, depression. Increased Optimism, sleep. Results maintained after 4 months with no additional treatments with 48% reduction in pain, 23% increase in sleep, 8% increase in optimism

Flotation Therapy - Health and Wellness



RECOVER

RESEARCH ARTICLE

Open Access

Beneficial effects of treatment with sensory isolation in flotation-tank as a preventive health-care intervention – a randomized controlled pilot trial

Anette Kjellgren^{1,2*} and Jessica Westman¹

Methods: Sixty-five participants (14 men and 51 women) who were all part of a cooperative-health project initiated by their individual companies, were randomized to either a wait-list control group or a flotation tank treatment group where they participated in a seven weeks flotation program with a total of twelve flotation sessions. Questionnaires measuring psychological and physiological variables such as stress and energy, depression and anxiety, optimism, pain, stress, sleep quality, mindfulness, and degree of altered states of consciousness were used. Data were analysed by two-way mixed MANOVA and repeated measures ANOVA.

Results: Stress, depression, anxiety, and worst pain were significantly decreased whereas optimism and sleep quality significantly increased for the flotation-REST group. No significant results for the control group were seen. There was also a significant correlation between mindfulness in daily life and degree of altered states of consciousness during the relaxation in the flotation tank.

Conclusions: It was concluded that flotation-REST has beneficial effects on relatively healthy participants.

Table 1 Means (and Standard deviations) for the psychological variables before and after the treatment period

Variable	Before	After	Difference
SE Stress control	1.84 (1.15)	1.89 (1.04)	+ 0.05 n.s
SE Stress floating	1.86 (1.07)	0.95 (0.84)	- 0.91 **
SE Energy control	3.44 (0.70)	2.63 (0.96)	- 0.81 n.s
SE Energy floating	3.14 (0.66)	2.46 (1.02)	- 0.74 n.s
HADS Anxiety control	7.03 (3.46)	6.96 (3.52)	- 0.07 n.s
HADS Anxiety floating	7.92 (4.61)	4.28 (3.61)	- 3.64 **
HADS Depression control	4.00 (3.41)	4.30 (2.58)	+ 0.30 n.s
HADS Depression floating	4.42 (3.47)	2.25 (2.53)	- 2.17 **
LOT optimism control	20.96 (5.05)	20.93 (5.76)	- 0.03 n.s
LOT optimism floating	19.81 (5.29)	23.28 (4.26)	+ 3.47 **
SQ Sleep Quality control	25.22 (9.98)	25.33 (8.87)	+ 0.11 n.s
SQ Sleep Quality floating	23.72 (7.55)	29.69 (8.44)	+ 5.97 **

** = significant effect, $p < 0.001$; n.s = non significant effect.

Table 2 Means (and Standard deviations) for the pain variables before and after the treatment period

Variable	Control group	Flotation-REST group
VAS Worst pain before	64.76 (25.14)	64.29 (28.12)
VAS worst pain after	55.15 (28.97)	39.70 (32.11)
VAS normal pain before	30.28 (21.92)	27.32 (20.12)
VAS normal pain after	25.68 (17.15)	15.00 (17.17)

Enhancing Perceptual-Motor Accuracy Through Flotation REST

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University of British Columbia

Table 1
Baseline and Postsession Performance (in mm)

Group	Baseline		Postsession		% change in accuracy
	M	SD	M	SD	
I	106	26	108	30	- 1.9
R	93	16	82	25	+ 11.5
RI	85	28	75	28	+ 13.3
C	86	23	87	25	- 0.5

Note. Scores represent distance from bull's-eye; therefore, lower scores (but higher percentage changes) indicate higher accuracy.

Previous studies using flotation Restricted Environmental Stimulation Technique (REST) to enhance motor performance have focused on relatively gross arm and leg movements and have combined the technique with a variety of imaginal practice and relaxation training procedures. This study independently varied REST and an imaginal training and relaxation script to improve accuracy among novice, intermediate, and expert darts players. **REST by itself and REST combined with the script were equally effective in enhancing performance** (M change about -12%). The imagery script alone and a no-treatment control condition resulted in no change on test-retest measures. The results indicate that in the area of perceptual-motor coordination, REST is not merely a potentiator of other techniques, but a useful and efficient unimodal intervention, which takes a short time and does not require further rehearsal or repetition.

Effects of Relaxation Associated with Brief Restricted Environmental Stimulation Therapy (REST) on Plasma Cortisol, ACTH, and LH

John W. Turner, Jr., and Thomas H. Fine
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*Restricted Environmental Stimulation Therapy (REST), which involves placing an individual into an environment of severely reduced stimulation for brief periods, has been subjectively reported to produce deep relaxation. The present study determines the **effects of REST-assisted relaxation on plasma cortisol, ACTH, and luteinizing hormone (LH)**. These parameters were also measured in a group exposed to a similar relaxation paradigm, but without REST (non-REST). **Each subject experienced two baseline sessions (1 and 2), four REST (or non-REST) relaxation sessions (3, 4, 5, 6), and two follow-up sessions (7 and 8)**. Pre- and postsession plasma hormone levels were measured in sessions 1, 2, 5, and 8. Both REST and non-REST subjects reported that the experience was relaxing. During the treatment period (session 5) pre- to postsession changes in cortisol and ACTH, but not in LH, were significantly greater for the REST group than for the non-REST group. **Plasma cortisol level also decreased across sessions in the REST group**, with levels in sessions 5 and 8 significantly lower than the baseline (sessions 1 and 2). **Non-Rest subjects showed no change in plasma cortisol across sessions**. No significant change in plasma ACTH or LH occurred across sessions in the REST or non-REST groups, although ACTH showed a decreasing trend. These data demonstrate that repeated brief REST-assisted relaxation produces a relaxation state associated with specific decreases in pituitary-adrenal axis activity.*

Original article

Curing the sick and creating supermen – How relaxation in flotation tanks is advertised on the Internet

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Highly reduced sympathetic activity for high-symp athletes (HRV)

Significantly reduced parasympathetic activity for high-parasymp athletes (HRV)

Significantly increased parasympathetic activity for in-balance athletes (HRV)

Highly reduced stress hormone (cortisol) pre vs. post Float

High reduction of symptoms in chronic pain patients

High reduction in blood pressure pre vs. post Float

Dramatic and reduced subjective stress, anxiety, fatigue. Increased energy, focus, creativity. Replicated by multiple studies

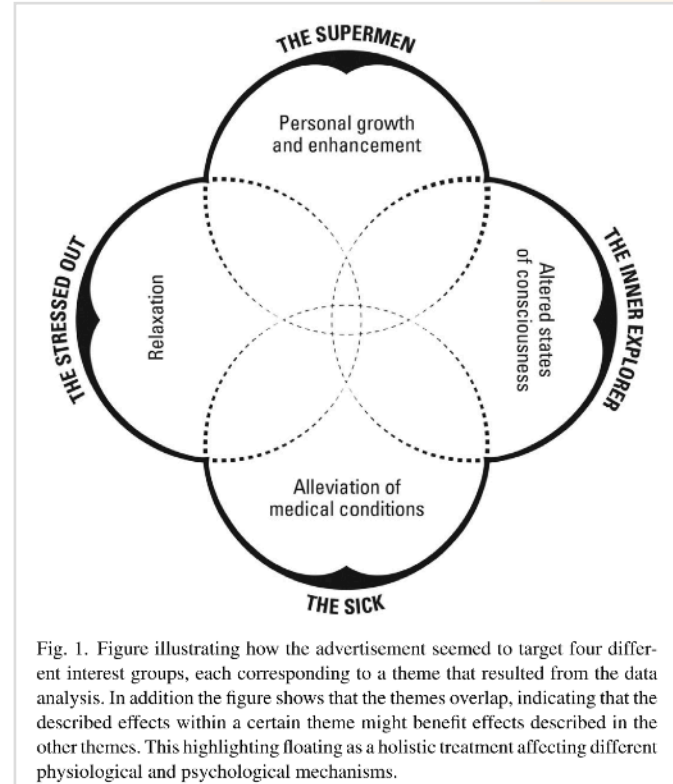


Fig. 1. Figure illustrating how the advertisement seemed to target four different interest groups, each corresponding to a theme that resulted from the data analysis. In addition the figure shows that the themes overlap, indicating that the described effects within a certain theme might benefit effects described in the other themes. This highlighting floating as a holistic treatment affecting different physiological and psychological mechanisms.

Flotation Therapy - Study: ANS Balance

RECOVER

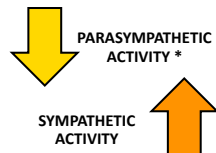
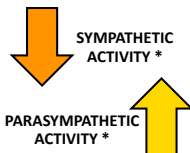
AUTONOMIC NERVOUS SYSTEM PRE FLOAT

HIGHLY SYMPATHETIC

HIGHLY PARASYMPATHETIC

IN BALANCE

60 MINUTE FLOATATION THERAPY



High Sympathetic Going in? Massive Reduction in 60 minutes

Parameter	Avg_pre	Avg_post	%change	P values
Omega	9.58±16.62	11.82±16.47	23.382	0.359
Stress index	3.1±1.07	4.84±1.44	56.129	0.000
Fatigue	4.57±1.86	5.95±1.41	30.197	0.000
Adaptation reserves	3.53±1.1	4.5±1.11	27.479	0.000
CNS	5.21±1.66	5.62±1.74	7.869	0.116
HRat anaerobic threshold	167.48±4.1	169.15±3.71	0.997	0.000
Aerobic status index	110.39±22.64	110.87±23.09	0.435	0.627
Anaerobic status index	138.43±4.73	138.23±4.98	-0.144	0.630
Metabolic reaction index	219.03±91.84	215.34±90.33	-1.685	0.569
MRI grade	3.6±1.54	3.53±1.56	-1.944	0.597
Metabolic grade	4.49±1.16	4.55±1.1	1.336	0.528
Vagus	0.17±0.05	0.26±0.1	52.941	0.000
Sym Reg	53.31±12.08	38.09±13.34	-28.550	0.000
Tension index	266.91±234.52	130±178.93	-51.294	0.001
Aperodic	2.27±1	2.08±0.8	-8.370	0.217
Aspirate	0.01±0.01	0.03±0.02	200.000	0.000
SNINN	36.97±11.15	61.46±24.82	66.243	0.000
SDSD	40.87±19.08	67.54±31.35	65.256	0.000
RMSSD	31.91±14.63	53.13±24.85	66.500	0.000
Total Power	472.94±372.28	1611.1±1770.98	240.656	0.000
LHF	2.54±3.28	2.29±4.14	-9.843	0.684
HF	184.16±174.56	687.81±1182.57	273.485	0.002
HF.n.u.	42.79±21.08	46.21±22.26	7.993	0.336
LF	206.44±168.32	768.75±959.22	272.384	0.000
LF.n.u.	57.21±21.08	53.79±22.26	-5.978	0.336

High ParaSympathetic Going in? Significant Reduction in 60 minutes

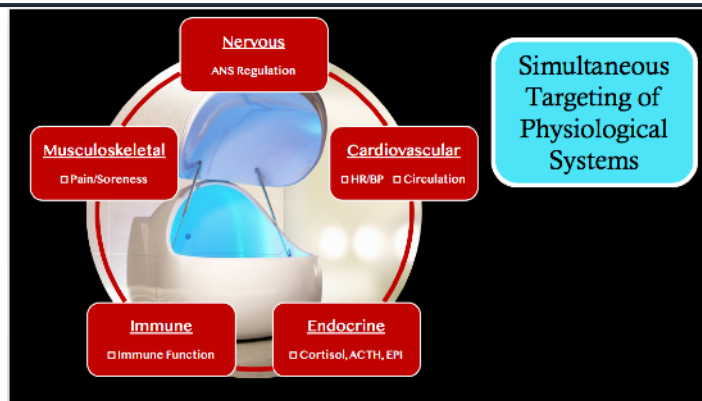
Parameter	Avg_pre	Avg_post	%change	P values
Omega	9.58±16.62	11.82±16.47	23.382	0.419
Stress index	6.06±1.26	5.78±1.17	-4.620	0.5
Fatigue	6.33±0.84	8.39±1.29	0.948	0.886
Adaptation reserves	5.22±0.81	5.5±1.15	5.364	0.439
CNS	6.5±0.86	6.17±1.42	-5.077	0.421
HRat anaerobic threshold	171.12±3.84	171.65±4	0.310	0.518
Aerobic status index	113.67±11.03	110.95±13.93	-2.393	0.263
Anaerobic status index	138.49±5.07	138.5±4.9	0.007	0.965
Metabolic reaction index	203.88±84.84	243.54±135.72	19.453	0.225
MRI grade	3.22±1.59	3.67±1.53	13.975	0.227
Metabolic grade	4.28±1.11	4.43±0.87	3.505	0.554
Vagus	0.47±0.1	0.38±0.11	-19.149	0.002
Sym Reg	21.78±5.26	25.83±8.91	18.595	0.082
Tension index	24.33±9.99	39.44±25.92	62.104	0.018
Aperodic	1.56±0.64	1.7±0.61	8.974	0.408
Aspirate	0.05±0.03	0.04±0.02	-20.000	0.244
SNINN	120.62±29.61	98.71±32.64	-18.164	0.024
SDSD	148.95±52.53	129.06±57.56	-13.353	0.11
RMSSD	117.5±41.43	102.22±45.9	-13.004	0.129
Total Power	5390.03±1019.52	3961.43±2712.84	-26.504	0.142
LHF	1.5±1.49	1.25±1.13	-16.667	0.566
HF	2185.18±1794.44	1863.88±1300.79	-14.704	0.523
HF.n.u.	47.44±16.41	53.28±20.34	12.310	0.256
LF	2606.5±2486.69	1739.14±1689.48	-33.277	0.11
LF.n.u.	52.56±16.41	46.72±20.34	-11.111	0.256

In Balance Going in? Come out in balance, but with a significant Parasympathetic Boost in 60 minutes

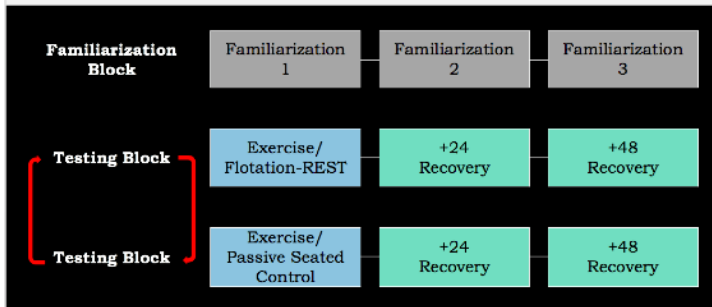
24.9% Reduction in blood Cortisol pre/post float (p<0.05)!

Flotation Therapy - Study: Kraemer Lab @ Ohio State

RECOVER



The Effects of Acute Flotation Therapy on Recovery from Intense Anaerobic Exercise

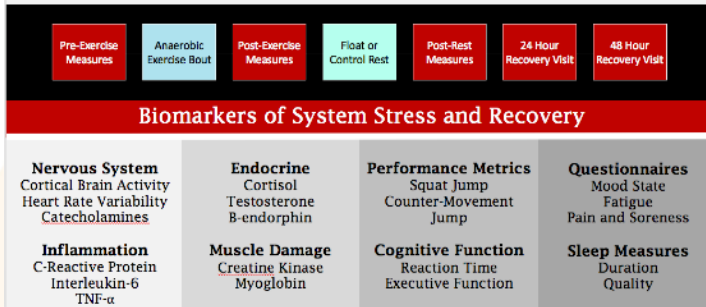


Acute Flotation Therapy and the Stress Response:

Implications for the Elite Athlete and Military Operator



The Effects of Acute Flotation Therapy on Recovery from Intense Anaerobic Exercise



Flotation Therapy - Studies at the RNI



RECOVER

Mechanistic Study of Flotation Therapy: From Neural to Blood Biomarkers

Athletes / Military

Flotation Therapy and Effects on Sleep in Elite Performers
Individualized Signature of Recovery in Elite Performers
Flotation Therapy for Concussion Treatment

Patients

Flotation Therapy for Clinical Pain Patients
Flotation Therapy for Reduction of Inflammation Biomarkers

Population

Flotation Therapy and Effects on Sleep in General Population
Flotation Therapy for Stress Reduction in Executive Health and Medical Students