EXTREME CONDITIONING TRAINING: ACUTE EFFECTS ON MOOD STATE

EFEITOS AGUDOS DO TREINAMENTO DE CONDICIONAMENTO EXTREMO NOS ESTADOS DE HUMOR

EFECTOS AGUDOS DEL ENTRENAMIENTO DE CONDICIONAMIENTO EXTREMO EN LOS ESTADOS DE HUMOR

ABSTRACT

Introduction: The search for strategies aimed at reducing daily stress is increasing in the current literature. As a result, several types of fitness training are constantly being investigated for their influence on mood states. However, we know little about strategies that use higher intensities. Objective: To investigate the acute effects of an extreme conditioning training (ECT) session on the mood states of individuals with or without prior experience in this type of training. Methods: Volunteers were divided into TRAINED (n = 10) and CONDITIONED (n = 10) groups, undergoing a single 9-minute ECT session. Mood states (BRUMS scale) were analyzed at baseline, immediately afterwards, and after 30 minutes. Results: Anger, confusion and tension were significantly reduced in both groups immediately afterwards and post 30 minutes. The TRAINED group showed a significant reduction in fatigue 30 minutes after the end of the session. Effect size for all variables was considered small to moderate. The TRAINED group had significantly increased vigor immediately after the end of the session compared to baseline. However, the CONDITIONED group had significantly reduced vigor 30 minutes afterwards, in comparison to baseline. The increase in vigor in the TRAINED group was considered moderate (ES = 0.68), while the decrease in vigor in the CONDITIONED group was considered major (ES = -0.88). Conclusion: An ECT session is powerful enough to induce significant, albeit small and moderate, changes in mood states in both trained and untrained individuals in this particular type of exercise. Level of evidence II, Therapeutic studies-investigation of treatment results.

Keywords: Behavior; Exercise; Motivation; Motor activity.

RESUMO

Introdução: A busca por estratégias que visam reduzir o estresse cotidiano é crescente na literatura atual. Com isso, diversos tipos de treinamento físico são constantemente pesquisados por sua influência nos estados de humor. No entanto, pouco sabemos sobre as estratégias que usam intensidades mais elevadas. Objetivo: Investigar os efeitos da sessão de treinamento de condicionamento extremo (TCE) sobre os estados de humor de indivíduos com ou sem experiência prévia nesse tipo de treinamento. Métodos: Os voluntários foram divididos em grupos TREINADO (n = 10) e CONDICIONADO (n = 10), submetidos a uma única sessão de TCE por 9 minutos. Os estados de humor (escala BRUMS) foram analisados no início do estudo, imediatamente após e depois de 30 minutos. Resultados: Raiva, confusão e tensão foram significativamente reduzidas em ambos os grupos imediatamente após e depois de 30 minutos. O grupo TREINADO mostrou redução significativa da fadiga 30 minutos após o término da sessão. O tamanho do efeito para todas as variáveis foi considerado pequeno a moderado. O grupo TREINADO teve aumento significativo do vigor imediatamente após o término da sessão, em comparação com o início do estudo. No entanto, o grupo CONDICIONADO teve redução significativa do vigor 30 minutos depois, em comparação com o valor basal. O aumento de vigor no grupo TREINADO foi considerado moderado (ES = 0.68), enquanto a redução do vigor no grupo CONDICIONADO foi considerada maior (ES = -0.88). Conclusão: Uma sessão de TCE é poderosa o suficiente para induzir mudanças significativas, embora pequenas e moderadas, nos estados de humor de indivíduos treinados e não treinados neste tipo específico de exercício. Nível de evidência II, Estudos terapêuticos - Investigação dos resultados do tratamento.

Descritores: Comportamento; Exercício; Motivação; Atividade motora.

RESUMEN

Introducción: La búsqueda de estrategias para reducir el estrés cotidiano es creciente en la literatura actual. Con ello, diversos tipos de entrenamiento físico son constantemente investigados por su influencia en los estados de humor. Sin embargo, poco sabemos sobre las estrategias que usan intensidades más altas. Objetivo: Investigar los efectos de la sesión de entrenamiento de condicionamiento extremo (EAE) sobre los estados de humor de individuos con o sin experiencia previa en ese tipo de entrenamiento. Métodos: Los voluntarios se dividieron en grupos ENTRENADO (n = 10) y CONDICIONADO (n = 10), sometidos a una sola sesión del EAE durante 9 minutos. Los estados de humor (escala BRUMS) se analizaron al inicio del estudio, inmediatamente después y después de 30 minutos. Resultados: La ira, la confusión y la tensión se redujeron significativamente en ambos grupos inmediatamente después y después de 30
The improvement of general well-being has been emphasized by several sectors of society. The active lifestyle and regular practice of physical exercises are effective in protecting and preventing various neurological diseases. Thus, the practice of physical exercise, in general, has been recommended as a non-drug alternative to the treatment and/or prevention of chronic degenerative diseases and cognitive improvements.

Most people experience the feeling of well-being (satisfaction and happiness with life) after physical exercise. In addition, the physical activity chosen may be associated with higher levels of well-being. Therefore, variations of mood states can be found with different forms of exercise modality. In concern to the modalities, the literature is consistent regarding the positive effects of running on the cognition and behavior. Additionally, strength and running exercises promote similar acute effects on mood states. However, not all physical training modalities present the same effects. Recently, moderate and high-intensity exercises are gaining prominence, as they bring similar benefits to others and require a shorter time investment. In the past few years, extreme conditioning training programs (ECT) became one of the most physical exercises searched by many people in Brazil. ECT is a high intensity/effort interval training methodology that has as main objective the improvement of all physical capacities (cardiorespiratory endurance, muscular endurance, strength, power, speed, coordination, flexibility, agility, balance, and precision). The great differential of this modality, compared to others, is presented by its challenging character and the large variability of stimulus presented in the training session. However, to date, there has been no research analyzing the impact of ECT training on the mood states of active individuals, whether or not trained in the modality. In this way, the present study aimed to evaluate the mood states of individuals trained and not trained in ECT, submitted to a training session of a high degree of physical effort.

METHODS

The present study was approved by the Ethics Committee of the São Judas Tadeu University, under the number CAAE (Certificate of presentation for ethical assessment) 37330614.7.0000.0089, pursuant to Resolution 466/12 of the National Health Council, by which regulates all methodological procedures in research with Human Beings.

All volunteers were informed of the objectives and procedures to be performed during this study, as well as their risks. The possible risks considered were:

1. Emotional discomfort when answering the questionnaires;
2. Bodily discomfort when performing the initial and final evaluations;
3. Fatigue and exhaustion during the high-intensity training session;
4. Psychological discomfort.

It should be noted that all these moments were accompanied by a professional who was able to assist and that the evaluations or sessions of the training program could be interrupted at any time a risk, discomfort or discomfort of the research participant was identified. If necessary, the volunteers were informed that the transport would be carried out to a prompt attendance of the hospital of the medical insurance of the individual or the public network.

Participants

Twenty adult men were divided into two groups based on the type of physical training practice in which they practiced: TRAINED (n = 10); Individuals practicing regular ECT and CONDITIONED (n = 10); running athletes that never practiced ECT.

The following inclusion criteria were considered:
- Being male;
- Age range between 20 and 40 years old;
- Be active for the last 6 months uninterrupted, according to the classification by the International Physical Activities Questionnaire - IPAQ short version.

The following exclusion criteria were considered:
- Participating in two or more concurrent training programs;
- Regular use (last 4 weeks) of substances such as anabolic steroids, psychotropics, antibiotics, and corticosteroids.

Experimental Protocol

The groups were evaluated on three different days following the same standards. Firstly, individuals arriving at the indicated place were given all the information regarding the study and all the evaluations that would be developed. The informed consent form (TCLE) was read together with the participants and all doubts were clarified. After reading and agreeing to participate in the survey, they signed all the routes of the TCLE and received their copy.

After that, the volunteers answered the IPAQ, the Physical Activity Readiness Questionnaire (PAR-Q) and, finally, the General Anamnesis. Afterward, they performed the body composition evaluation and were, therefore, able to initiate the training protocol.

On the second day, all the volunteers did an exercise familiarization session in the exact sequence to be trained. This procedure was performed with the objective of reducing the coordinating bias. Thus, on the third day, all subjects performed the evaluation of BRUMS mood states, before and after the training protocol described below.

For data collection, both groups were initially assessed at baseline. They then trained a single ECT session, which consisted of a combination of high-intensity multi-joint exercises with a predetermined time of 9
minutes. Being re-evaluated in the moments immediately after and 30 minutes after the end of the session.

The overall warm-up was composed of 3 sets of 10 movements of jump air squat and kettlebell swing. After this, the volunteers trained the high-intensity session composed of the following exercises:

- WOD (Workout of the day) - AMRAP (As many reps as possible) in 9 minutes - 5 reps of Cleans, 10 Wall Ball reps and 20 Double-Unders or Single-Unders reps.

With each successful round, an extra movement was added to each exercise, except for the double-unders and / or single-unders exercise, making the training session more exhaustive. Example:
- First round: 5 cleans, 10 wall ball, 20 double-unders and / or single-unders;
- Second round: 6 cleans, 11 wall ball, 20 double-unders and / or single-unders;
- Third round: 7 cleans, 12 wall ball, 20 double-unders and / or single-unders and so on until completing the nine minutes of WOD.

It is worth mentioning that the TRAINED group performed the clean exercise with an external load equivalent to 80% RM (stipulated in previous training) and the wall ball with 9kg. The load for the CONDITIONED group was purposely determined as singles load (20kg clean and 6kg wall ball), for the safety of the volunteers and maintenance of the movement techniques. It is noteworthy that even the external loads were different between the groups, both trained with the same subjective perception of effort.

Mood State Assessment (BRUMS)

This test was performed before, immediately after and 30 minutes after the end of the training session. Brunel’s mood states scale (BRUMS) was developed to allow rapid measurement of the mood state of populations composed of adults and adolescents.

Adapted from "Profile of Mood States - POMS", BRUMS contains 24 simple mood indicators. The volunteers responded in relation to these sensations, according to the scale of 5 points (0 = not at all, 1 = a bit, 2 = moderate, 3 = enough; 4 = extremely). The form put in the question was: “HOW DO YOU FEEL NOW?".

The 24 items on the scale make up six subscales: anger, confusion, depression, fatigue, tension, and vigor. Each subscale contains four items. With the sum of the answers of each subscale, we obtained a score that can vary from 0 to 16 (volunteers took about 10 minutes to answer the questions).

Statistical analysis

Data are presented as the mean and standard deviation (SD). To test the normality of the data we used the Shapiro–Wilk test. In the analysis between training moments, ANOVA one-way was applied followed by the Tukey post hoc test. For the inferential analyzes between the groups TRAINED (n=10) and CONDITIONED (n=10), the Tukey post hoc test was performed before, immediately after and 30 minutes post-session. ANOVA was applied followed by the Tukey post hoc test. For the inferential analyzes between the groups TRAINED (n=10) and CONDITIONED (n=10), the Tukey post hoc test was performed before, immediately after and 30 minutes post-session (p<0.05).

RESULTS

Anger

Descriptive and effect size data are presented in Table 1 and 2. Training of both groups significantly reduced anger in the moments immediately after (p<0.01). However, only CONDITIONED group maintained lower values at 30 min post-exercise (p<0.05). Despite this, ES analysis showed that both groups induced only a small and moderate reduction of this feeling.

Confusion

Both groups induced a significant reduction of the confusion variable in both post-session moments (p<0.01). ES revealed that the TRAINED group presented a mild-moderate effect, whereas the CONDITIONED group had a moderate effect on the reduction of this feeling.

Depression

Both groups induced a significant reduction of the depression variable, in both moments (p<0.01). However, CONDITIONED group presented a tendency to lower depression (p=0.05). The ES calculation showed that both groups had a mild-moderate effect on this feeling.

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Table 1. Descriptive data for anger, confusion, depression, fatigue, tension and vigor, measured for moments baseline, immediately after (IP) and 30 minutes post-session (+30 min) between groups TRAINED (n=10) and CONDITIONED (n=10).

<table>
<thead>
<tr>
<th>Variable</th>
<th>Groups</th>
<th>Baseline</th>
<th>IP</th>
<th>+30 min</th>
<th>F</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anger</td>
<td>TRAINED</td>
<td>0.11±0.32</td>
<td>0*</td>
<td>0.05±0.21</td>
<td>2.928</td>
<td>0.057</td>
</tr>
<tr>
<td></td>
<td>CONDITIONED</td>
<td>0.45±0.99</td>
<td>0*</td>
<td>0.05±0.22*</td>
<td>7.153</td>
<td>0.001</td>
</tr>
<tr>
<td></td>
<td>P Value</td>
<td>&gt;0.05</td>
<td>&gt;0.05</td>
<td>&gt;0.05</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Confusion</td>
<td>TRAINED</td>
<td>0.43±0.76</td>
<td>0.16±0.37*</td>
<td>0.07±0.33*</td>
<td>5.730</td>
<td>0.004</td>
</tr>
<tr>
<td></td>
<td>CONDITIONED</td>
<td>0.35±0.58</td>
<td>0.1±0.3*</td>
<td>0*</td>
<td>9.108</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>P Value</td>
<td>&gt;0.05</td>
<td>&gt;0.05</td>
<td>&gt;0.05</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Depression</td>
<td>TRAINED</td>
<td>0.14±0.35</td>
<td>0*</td>
<td>0.05±0.21</td>
<td>3.859</td>
<td>0.024</td>
</tr>
<tr>
<td></td>
<td>CONDITIONED</td>
<td>0.25±0.44</td>
<td>0.05±0.22*</td>
<td>0.1±0.44</td>
<td>2.982</td>
<td>0.055</td>
</tr>
<tr>
<td></td>
<td>P Value</td>
<td>&gt;0.05</td>
<td>&gt;0.05</td>
<td>&gt;0.05</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Fatigue</td>
<td>TRAINED</td>
<td>0.73±0.69</td>
<td>0.75±0.75</td>
<td>0.34±0.64*</td>
<td>4.773</td>
<td>0.01</td>
</tr>
<tr>
<td></td>
<td>CONDITIONED</td>
<td>1.1±0.9</td>
<td>1.55±1.34</td>
<td>1.45±0.99</td>
<td>1.874</td>
<td>0.158</td>
</tr>
<tr>
<td></td>
<td>P Value</td>
<td>&gt;0.05</td>
<td>&lt;0.05</td>
<td>&lt;0.05</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Tension</td>
<td>TRAINED</td>
<td>0.89±1.24</td>
<td>0.34±0.68*</td>
<td>0.27±0.54*</td>
<td>6.483</td>
<td>0.002</td>
</tr>
<tr>
<td></td>
<td>CONDITIONED</td>
<td>0.7±0.72</td>
<td>0.25±0.44*</td>
<td>0.4±0.59</td>
<td>5.920</td>
<td>0.004</td>
</tr>
<tr>
<td></td>
<td>P Value</td>
<td>&gt;0.05</td>
<td>&gt;0.05</td>
<td>&gt;0.05</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Vigor</td>
<td>TRAINED</td>
<td>2.36±0.97</td>
<td>2.0±1.09*</td>
<td>2.48±1.36</td>
<td>3.556</td>
<td>0.031</td>
</tr>
<tr>
<td></td>
<td>CONDITIONED</td>
<td>2.55±0.68</td>
<td>2.35±0.8</td>
<td>1.95±0.93*</td>
<td>5.680</td>
<td>0.004</td>
</tr>
<tr>
<td></td>
<td>P Value</td>
<td>&gt;0.05</td>
<td>&gt;0.05</td>
<td>&gt;0.05</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Table 2. Effect size (ES) for anger, confusion, depression, fatigue, tension, and vigor, measured for moments immediately after and 30 minutes post-session between groups TRAINED (n=10) and CONDITIONED (n=10).

<table>
<thead>
<tr>
<th>Variable</th>
<th>Moments</th>
<th>TRAINED (ES)</th>
<th>CONDITIONED (ES)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anger</td>
<td>Immediately after</td>
<td>-0.34</td>
<td>-0.45</td>
</tr>
<tr>
<td></td>
<td>30 minutes</td>
<td>-0.19</td>
<td>-0.40</td>
</tr>
<tr>
<td>Confusion</td>
<td>Immediately after</td>
<td>-0.35</td>
<td>-0.43</td>
</tr>
<tr>
<td></td>
<td>30 minutes</td>
<td>-0.47</td>
<td>-0.60</td>
</tr>
<tr>
<td>Depression</td>
<td>Immediately after</td>
<td>-0.40</td>
<td>-0.45</td>
</tr>
<tr>
<td></td>
<td>30 minutes</td>
<td>-0.25</td>
<td>-0.34</td>
</tr>
<tr>
<td>Fatigue</td>
<td>Immediately after</td>
<td>0.03</td>
<td>0.50</td>
</tr>
<tr>
<td></td>
<td>30 minutes</td>
<td>-0.56</td>
<td>0.39</td>
</tr>
<tr>
<td>Tension</td>
<td>Immediately after</td>
<td>-0.44</td>
<td>-0.62</td>
</tr>
<tr>
<td></td>
<td>30 minutes</td>
<td>-0.50</td>
<td>-0.42</td>
</tr>
<tr>
<td>Vigor</td>
<td>Immediately after</td>
<td>0.63</td>
<td>-0.29</td>
</tr>
<tr>
<td></td>
<td>30 minutes</td>
<td>0.12</td>
<td>-0.88</td>
</tr>
</tbody>
</table>
Fatigue
The TRAINED group demonstrated a significant reduction of fatigue 30 minutes after the end of the session (p < 0.05). However, no significant changes were found in the CONDITIONED group. The comparison between the groups revealed a significant difference for both post-session moments (p < 0.01). Both ES were considered to be moderate.

Tension
Both groups significantly reduced the tension at immediately post-session moment (p < 0.01). The TRAINED group maintained lower values at 30 min post-session (p < 0.05). ES for both groups was shown to be moderate.

Vigor
The TRAINED group significantly increased vigor immediately after the end of the training session compared to the baseline (p < 0.05). However, the CONDITIONED group significantly reduced its vigor 30 minutes after the end, in comparison to the baseline (p < 0.05). The increase in vigor seen in the TRAINED group was considered moderate (ES = 0.68), while the reduction of the same in the CONDITIONED group was large (ES = -0.88).

DISCUSSION
In this study, we present as a strong point the practice of a real ECP protocol. The use of the AMRAP protocol is widely used in the training centers of this modality and the association of mood states with this type of training model brings us new tools to control the stress associated with the daily life of most people. In addition, the use of a real magnitude of the training loads enables the application and reproducibility of the data demonstrated here. However, the use of different training loads (intensity and volume) may be a limitation of the study, although this difference was intentionally used. Thus, we can highlight the following results of our study: 1) the ECT modality presented a small to moderate effect on mood states in both individuals trained or not trained in this modality, and such an effect persisted for 30 minutes after the end of the training session; 2) individuals trained in ECP have reduced sensation of fatigue and increased vigor after the training session, demonstrating positive effects of this modality on mood states.

Werneck et al.7 evaluated the profile of mood states (POMS) in seven different training situations, consisting of resistance exercises and treadmill running, with different intensities and on alternate days. The authors demonstrated in their results that acute exercise sessions promoted changes in post-exertion mood, regardless of exercise type and intensity, thus confirming the findings presented here.

REFERENCES


