



CHAMP/ACSM Executive Summary: High-Intensity Training Workshop

Introduction

Extreme conditioning programs (ECPs; e.g., CrossFit, P90X, Insanity, Gym Jones, PT Pyramid, and others) are characterized by high-volume, aggressive exercise workouts with a variety of high-intensity exercise repetitions and short rest periods between sets. These metabolically and physically demanding programs continue to generate growing interest and enthusiastic support among military and civilian communities. Emerging problems associated with ECPs have been identified, to include muscle strains, torn ligaments, stress fractures, and mild to severe cases of potentially life-threatening exertional rhabdomyolysis. Musculoskeletal injuries resulting in lost duty time, medical treatment, and extensive rehabilitation are a significant and costly concern with regard to effectively maintaining physical and operational readiness of the Force.

The Department of Defense (DoD) and American College of Sports Medicine (ACSM) convened a workshop at the Uniformed Services University, Bethesda, Maryland to address the issue of high-intensity training (HIT) programs. The workshop was structured into primary topic blocks: definition, guidelines for safe implementation, and future research considerations. During the session, all participants agreed to change the “HIT” nomenclature to “Extreme Conditioning Programs” to more accurately describe the programs being addressed and to include terms used by such programs.

Positive Characteristics

ECPs are multi-faceted, circuit training-like fitness programs utilizing varying forms of resistance training and challenging repeated body weight exercises including plyometrics. For many warfighters, the exercise pace and difficulty are motivating, exciting, and appear to target a niche of otherwise unmet training needs and desires. Additionally, the specific exercises and repetitions arguably address a broad range of “in-theater,” real world, occupational physical activities and demands that warfighters believe will better promote combat readiness.

Negative Characteristics

Certain distinctive characteristics of ECPs appear to violate recognized accepted standards for developing muscular fitness. For example, performing a high number of exercise repetitions without adequate rest intervals between sets fails to adhere to appropriate and safe training guidelines. This training paradigm, when coupled with insufficient recovery time, readily prompts earlier fatigue, greater perception of effort, and possibly overuse, over-reaching, and overtraining. ECPs can also be very competitive when performed in group settings, and encourage warfighters to “keep up” with others who may be more fit and stronger, which can increase injury risk. Moreover, these programs are not sufficiently inclusive of all conditioning and training needs.

Recommendations

The positive aspects of ECPs are recognized and appreciated, and ECPs fill a widespread perceived and/or otherwise actual unfulfilled conditioning need for many individuals and military units. Thus, ECPs are likely to remain on the landscape of available and promoted physical conditioning options. Therefore, practical solutions to effectively improve ECP implementation and reduce injury risk are of paramount importance. This can begin with better screening and stratifying warfighters for initial fitness and injury risk, prior to participation in any ECP. Secondly, appropriate provisions and program

modifications to reduce injury risk, as well as regular monitoring, are essential. Thirdly, military leaders should be strongly advised to consider the rigor of a unit's daily occupational and operational training, combined with medical, external, and environmental risk factors. This will ensure that planning for physical readiness training does not conflict with other injury risk magnifying factors. For example, extensive military training and same-day exhaustive physical training or fitness testing should be avoided, as this increases risk and demands controls to overcome the effects. To this end, recommendations to improve the efficacy and safety of ECPs are:

- Conduct regular inspections of designated exercise areas to evaluate safety and efficacy of planned exercise within the existing environment;
- Introduce ECPs to new participants gradually – that is, provide a specific, stepwise progression (acclimation) to exercise intensity, duration, and advanced exercises, while ensuring suitable rest periods;
- Individualize supplemental conditioning programs (particularly ECPs) based on fitness, training goals, and job-specific functional needs and demands, while limiting full participation in ECPs to those already progressively acclimated, very fit and healthy. Anyone with a clinical condition or health status that would contraindicate participating in ECPs or other high-intensity physical activities should not be allowed to participate until medically cleared;
- Increase the duration of rest periods between sets of exercise and include regularly planned days of reduced or no supplemental conditioning (especially just before or after exhaustive military training) to optimize recovery, promote positive training adaptations, and minimize excessive fatigue. In addition, planned variation and periodization throughout each training cycle are imperative;
- Monitor closely for the emergence of overtraining symptoms (often simply indicated by unusual fatigue and/or muscle soreness), musculoskeletal injuries, and rhabdomyolysis, which should prompt immediate medical referral based on obvious signs and symptoms, such as dark brown urine or severe muscle pain; and
- Examine profile rates and other indicators of reduced performance capacity (*e.g.*, fitness test results, run times, and resting heart rate) to provide insights into evolving overtraining.

Importantly, new research is critical to affirm or negate the purported undue injury risk from participating in any ECPs and to clarify other modifiable contributing factors. Research priorities should include: (1) Collecting comprehensive injury data from those participating in ECPs; (2) Assessing information on the efficacy of ECPs and the magnitudes of increase (or decrease) in key performance metrics (*e.g.*, functional strength, power, and endurance, agility, mobility); and (3) Developing and promoting evidence-based conditioning programs that are attractive to warfighters so operational readiness is optimized and musculoskeletal injury risk is minimized.

Conclusions

Many strengths and weaknesses are inherent to all ECPs and many other conditioning programs. Military leadership, in collaboration with scientifically trained clinical and fitness support personnel, should objectively and comprehensively monitor and evaluate physical conditioning programs and their implementation to determine their strong points and pitfalls. The aim is to endorse or refine current programs and/or develop new ones, so that attractive, effective, and safe evidence-based conditioning strategies and programs can be implemented for all personnel to meet their occupational and operational demands and expectations.

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