The Components of Recovery for Tactical Operators

Tactical operators (e.g., military personnel, law-enforcement officers, and firefighters) are frequently exposed to stressors that can induce harm and have a detrimental effect on training, performance outcomes, and most importantly, health (1,2). TOs are subject to combinations of physiological and psychological stress due to their occupational responsibilities (3). However, their job tasks can range from physically non-demanding (e.g., administrative work) to highly demanding (e.g., chasing an assailant or administering a mission) (4). Each tactical operator has different responsibilities upon their discipline and their health, well-being, and preparedness is crucial to their mission success (5).

It is well documented that TOs experience stressful situations that impact their physiology, psychology, and behaviors (6). Therefore, it is critical for TOs to value the processes of physiological, psychological, and behavioral restoration for a return to homeostasis. When individuals are focused on an active lifestyle, a variety of components need to be considered to keep the body in optimal conditions. Today, tactical strength and conditioning programs need to be focused on occupational performance and mission preparedness, but they should also focus on health, injury prevention, and premature mortality (7). An improved recovery from previous stressors and fatigue can help enhance the TO’s ability to perform occupational tasks over time (5,8). When TOs experience an incomplete recovery from missions, training, or personal factors, it can hinder their preparedness for future settings (5).

This article is focused on what should be valued for optimal recovery based on relevant research and literature. Each section is focused on improving preparedness for occupational tasks, such as missions or trainings.

The Components of Optimal Recovery

Recovery is a complex and multifactorial issue that is recently striking as an important topic in the tactical world (9). In order to restore the body from the rigors of life, training, and occupational hazards, it is ideal to combine the use of influential components that will enhance the recovery process. These components can help improve health behaviors, coping skills, and well-being, so TOs can manage their health by making mindful and proactive choices (10). It is important for these tactical operators to understand the use of strategies to improve their health (physiologically and psychologically), manage stress efficiently, fuel the body with nutritious foods, attain high quality and proper quantity of sleep, and perform training procedures that fit the needs for TOs. Figure 1 provides the cycle of components for recovery.

Figure 1. The Components of Recovery

Health

When examining the aspects of health, research has shown that TOs may be susceptible to a variety of health issues. Research by Dedeaux and Lewis shows that military personnel experience an increase in post-traumatic stress disorder, high levels of anxiety, lower health composite scores, and decreased perception of their health (11). It has been documented that law enforcement officers face many challenges with their health and fitness due to the nature of their occupation (12). While on duty, law enforcement officers require the occasional high-intensity and stressful bout of activity; however, their job can be predominantly sedentary (12). Firefighters place their bodies in demanding lines of work that can have extreme cardiovascular strain (13). This strain can be from the heavy and constricting personal protective equipment (i.e., loaded carriage), extreme heat, and stressful work environments (13). The loaded carriage needed for firefighters can result in additional cardiovascular strain and potentially musculoskeletal injuries (13,14,15). As the load increases for firefighters or military personnel, it can change biomechanical and physiological demands, thus increasing energy expenditure (15).

It is important to remember that recovery does not just include the regenerative process from a physiological perspective, but also the psychological side. TOs can experience a variety of situations...
THE COMPONENTS OF RECOVERY FOR TACTICAL OPERATORS during the line of duty that may require force. Individuals that experience traumatic events become at risk of remaining in a heightened sympathetic state, which can generate unwanted responses (1). Symptoms from traumatic events can include, but are not limited to, nightmares, decreased sleep, social isolation, suicidal ideation, altered mood states, dissociation, irritability, exaggerated startle responses, and feelings of detachment (1). If a TO experiences these symptoms, it can be detrimental to themselves, but also involved parties by the cost of their life or major injuries.

TOs are expected to remain in good physical condition so they can efficiently and effectively respond to a situation. When tactical facilitators value the support of good health, their performance via physiological functions and psychological mechanisms can improve (4). Therefore, we encourage TOs to value their health, not only from a physiological perspective, but also psychologically as well.

Tactical facilitators should encourage their team to receive a regular checkup with a physician. This periodic (usually annually) health examination provides the opportunity to get any ongoing medical issues addressed and counsel on preventive care (16). These checkups provide opportunities for physicians to counsel, deliver physical examinations, order laboratory investigations, and recommend immunizations (16). We highly recommend TOs to continue regular checkups so appropriate preventative actions and medical practices can be administered. If TOs have the opportunity, arranging frequent checkups and health screenings beyond their annual physical is encouraged. This frequency may benefit their overall health (physiologically and psychologically).

**STRESS**

Stress is a complex process and it can affect an individual’s health and performance by means of physiological and psychological implications (17). When it comes to TOs, they are continuously reminded of the risks and dangers they may face while on duty (18). The stress that TOs may experience are described as uncertain and unpredictable by actions of lethal force, fire suppression, or assailant restraints (19). Physiological parameters (e.g., heart rate and heart rate variability) change during lethal situations (20). However, a dysfunctional homeostatic return reduces the mechanism of optimal recovery.

Unfortunately, stress management skills are considered to be a challenge among many and are recognized globally (17). When individuals do not appropriately manage stress, they leave their bodies in a highly activated state. The activated state of the central nervous system (i.e., sympathetic nervous system: fight or flight) generates a stress response and the repercussions on health have been highly recognized (17). These impacts on health can result in problems such as heart disease, hypertension, upper respiratory tract infections, peptic ulcers, reduced immunity, migraines, alcoholism, depression, anxiety, as well as other health problems (17). Therefore, tactical facilitators need to help enhance stress management techniques for homeostatic return when stress is experienced.

Tactical facilitators should operate an environment that educates TOs to appropriately manage stress, so it ultimately does not affect their physiological or psychological adaptations (Table 1). When it comes to managing stress, it is ideal for TOs to find a technique that works for them. TOs need to be resilient and use safe and efficient coping strategies to manage stress, burnout, and psychological consequences from critical occupational events (19).

**TABLE 1. STRESS MANAGEMENT TECHNIQUES (21,22)**

<table>
<thead>
<tr>
<th>TECHNIQUES</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breathing</td>
<td>Sequenced, smooth, and slow breathing that focuses on a calming nature to</td>
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<tr>
<td></td>
<td>produce relaxation.</td>
</tr>
<tr>
<td>Meditation</td>
<td>A mind-to-muscle relaxation technique that utilizes an objective focus to</td>
</tr>
<tr>
<td>Mental Imagery and Visualization</td>
<td>clear the mind, resulting in physiological and psychological benefits.</td>
</tr>
<tr>
<td>Music</td>
<td>Tone, rhythm, or lyrics that provides relaxation in the body.</td>
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<tr>
<td>Massage</td>
<td>Manual therapy that involves manipulating points in the body that are</td>
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<tr>
<td></td>
<td>musculoskeletal tense and tight.</td>
</tr>
<tr>
<td>Movement</td>
<td>The integration of physical activity and exercise that allows the neuromuscular,</td>
</tr>
<tr>
<td></td>
<td>respiratory, and circulatory systems to work together.</td>
</tr>
<tr>
<td>Biofeedback</td>
<td>A technique that enhances the mind and body connection with the assistance of</td>
</tr>
<tr>
<td></td>
<td>technology via physiological parameters.</td>
</tr>
<tr>
<td>Progressive Muscle Relaxation</td>
<td>A technique to reduce muscle tension by isolating a specific muscle group</td>
</tr>
<tr>
<td></td>
<td>with the process of creating tension and then followed by relaxation.</td>
</tr>
<tr>
<td>Mindfulness</td>
<td>Focusing one’s attention on the present moment, while living in the here and</td>
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<td></td>
<td>now.</td>
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</table>
Queirós and Passos define resilience as the process of positive adaptations during and after a difficult situation, additionally, as the ability to cope from stressors from an adverse situation (19). The ability to safely and appropriately recover and adapt from uncertain and unpredictable situations can reduce the biological stress levels in the body.

**NUTRITION**

It is clear that biological adaptations can be amplified or negatively affected by an individual’s nutritional status (23). Foods are filled with nutrients to help sustain life and without them, energy balances would not be adequate for daily tasks. When it comes to food consumption, one should plan with the considerations of adapting to support changes in an individual’s goals, training levels, and their individual metabolic requirements (23). In addition to food consumption, TOs must emphasize hydration, as homeostatic water balance is essential for metabolism, transportation of nutrients and waste, circulation, and temperature regulation (24).

TOs are encouraged to maintain a level of physical fitness to optimize their concentration, performance, and safety. Additionally, TOs need to focus on nutrition strategies that promote good health, which can enhance performance while on duty (2). Research by MacKenzie-Shalders and Matthews provides substantial evidence of some barriers of why an individual may not be eating healthy (2). This research utilized a survey of 159 law enforcement officers and determined existing barriers that officers experience: busy lifestyle (59.5%), irregular working hours (40.5%), lengthy food preparation (34.8%), price of healthy foods (32.3%), knowledge of cooking (30.4%), and not knowing enough about healthy eating (29.1%) (2).

**RECOVER WITH OPTIMAL NUTRITION**

A tactical facilitator should be aware of these barriers so appropriate nutrition education and interventions can be implemented to improve their TOs’ physical performance and overall health. Nutrition can offer one of the most effective and inexpensive ways to decrease the burden of diseases and their associated risk factors (25). When it comes to nutrition improvement, appropriate strategies need to be set that fall within the scope of a tactical facilitator. As a tactical facilitator, one can provide general recommendations to their TOs about nutrition, scheduling and time management, meal preparation, and food budgeting. These recommendations could include the importance of consuming adequate lean protein sources, increasing vegetable intake, as well as incorporating carbohydrates to fuel and refuel from various physical demands. In recent findings, TOs failed to meet basic energy demands and carbohydrate recommendations, and also exceeded fat recommendations (26). We recommend TOs to prioritize the nutrients in their meals to optimize recovery (Table 2). If the work falls outside the scope of practice, it is important to provide recommendations of trustworthy professionals (e.g., registered dietitian) for continued nutritional support and guidance. It is important for tactical facilitators to understand the line of when nutritional guidance becomes outside their range and an external source is needed, such as a registered dietitian.

Although nutrition can be affected by the aforementioned elements (e.g., health and stress), one’s nutritional habits can be improved through nutrition education. TOs should be educated on the importance of meal considerations to improve optimal recovery through nutritional habits, behaviors, and food choices (25). If one can improve their habitual behaviors when it comes to their nutritional consumption, it can help improve their bodily

<table>
<thead>
<tr>
<th>MEAL CONSIDERATIONS</th>
<th>DESCRIPTION</th>
<th>SOURCE EXAMPLES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Build</td>
<td>Foods that help build muscle tissue that are rich in amino acids.</td>
<td>Protein: chicken, pork, soy, fish, beef, beans, milk</td>
</tr>
<tr>
<td>Fuel</td>
<td>Foods that are rich in carbohydrates that supply energy for the brain and activity.</td>
<td>Carbohydrates: fruits, pasta, rice, potatoes, bread, whole grains</td>
</tr>
<tr>
<td>Prevent</td>
<td>Foods that provide natural vitamins, minerals, and antioxidants to help repair the body and maintain the immune function.</td>
<td>Vegetables: peppers, carrots, onions, spinach, cauliflower, celery, peas, kale, broccoli, cabbage, mushrooms, cucumbers, squash</td>
</tr>
<tr>
<td>Protect</td>
<td>Foods that are rich in lipids, which help support and regulate bodily functions such as hormones and transport vitamins.</td>
<td>Fats: olive oil, avocado oil, avocados, butter, nuts, cheese, seeds, coconut</td>
</tr>
<tr>
<td>Hydrate</td>
<td>Proper hydration from liquids help provide transportation, lubrication, and act as a coolant for the body.</td>
<td>Water</td>
</tr>
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</table>

TABLE 2. MEAL CONSIDERATIONS (27)
functions and overall, their recovery between shifts and training. It is important to consider that nutrition is also influenced by societal, environmental, and economic challenges (25). Nutrition is complex and there are a variety of factors that need to be considered when looking to optimize one’s nutrition. Therefore, tactical facilitators need to understand this so appropriate actions can be recommended.

SLEEP
Sleep is defined as a natural and reversible state of reduced responsiveness to external stimuli and relative inactivity by loss of consciousness (28). The benefits of sleep are vital to our survival. These benefits serve as an energy-saving function, restoration of energy resources and the repairing cell tissue, thermoregulation, metabolic regulation, and adaptive immune function (28). It is important to consider that sleep provides a powerful process for the brain and may serve its primary purpose for the brain (28). A variety of functions have been proposed on its value to the brain, such as detoxication from free radicals and glycogen replenishment for memory and synaptic plasticity (28).

Although sleep serves a powerful purpose in biological order, the occurrences of sleep disturbances are high among TOs (firefighters 37%; law enforcement officers 40%; military personnel 58%) (29,31). TOs are among occupations that hold unique work schedules that include day, swing, or graveyard shifts. Research has provided evidence that decreased sleep can increase the risk of musculoskeletal injury (32). Data collected by an electronic survey from United States Army Special Operations Command showed that soldiers who slept less than four hours were 2.35 (95% CI: 1.89 – 2.93, p < 0.01) times more likely to experience an injury compared to those who had eight hours of sleep (32). Sleep has been shown to be a valuable asset to performance and optimal recovery, especially while managing the load in the tactical occupation from missions, cases, situations, or training stimulus (32).

RECOVER WITH SLEEP
Since sleep can be impacted by a variety of things, there is no one-size-fits-all approach to the recommendations (Table 3) on sleep (33). Thus, recommendations should consider job requirements, work shifts, and training schedules (33). In order to improve sleep quality and quantity, tactical facilitators should support their team by educating, screening, and providing feedback (33). These general procedures of sleep support from a tactical facilitator can help improve TOs understanding of sleep values and screen for limitations that hinder sleep so that information can be communicated for future change. It is important to understand the line of when sleep guidance becomes outside the scope of a tactical facilitator, and further guidance is needed by an external source, such as a sleep specialist.

### TABLE 3. SLEEP RECOMMENDATIONS (33)

<table>
<thead>
<tr>
<th>SLEEP RECOMMENDATIONS</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caffeine</td>
<td>Reduce caffeine consumption the hours before planned sleep as it impacts the sleep-wake physiology.</td>
</tr>
<tr>
<td>Stress</td>
<td>Encourage individuals to reduce worry or engage in relaxing activities before planned sleep.</td>
</tr>
<tr>
<td>Noise</td>
<td>Minimize surrounding noises in an individual’s sleeping environment such as local traffic, music, and plumbing sounds.</td>
</tr>
<tr>
<td>Timing</td>
<td>If possible, try to organize and plan a sleep schedule that is consistent to help physiological sleep drive and circadian rhythms.</td>
</tr>
<tr>
<td>Exercise</td>
<td>A regular exercise routine can help improve body temperature and arousal during sleep.</td>
</tr>
<tr>
<td>Alcohol</td>
<td>Avoid excessive use of alcohol before bedtime, as research has shown associations with decreased quality of sleep.</td>
</tr>
<tr>
<td>Nicotine</td>
<td>Avoid nicotine all together, or at least, before planned sleep as it stimulates arousal and wakefulness.</td>
</tr>
</tbody>
</table>

TRAINING
As a tactical facilitator, training for optimal performance and recovery is what we live, love, and care about. Tactical facilitators need to consider the differences of a TO’s activities throughout their programming. Not only do TOs need to develop their fitness capacities, but they also need to enhance their tactical skills as well. If TOs improve their fitness capacities, one can expect that their tactical skills will improve as well by means of their cognitive processing, motor learning, and performance (34,35). Therefore, the authors recommend that tactical facilitators deliver programs that target the combination of a regular fitness program as well their tactical skills in the training environment.

FITNESS TRAINING
When individuals reduce their participation of a regular fitness program or overall reduce physical activity, they may experience deconditioning, reversibility, or detraining (13,36,37). Due to this experience, it may lead to a rapid decline in physiological parameters such as lean muscle mass and muscular strength (13). Detraining can result in detriment of body fat estimations, aerobic capacity, and muscular endurance, due to the limited participation of a regular fitness routine (13). The TO’s tasks may...
include unique movements and high demands on physiological capacities, so it is recommended to follow regular strength and conditioning program to prepare the body for those demands. However, when TOs are deployed, participating in a regular fitness routine may be a challenge due to time or equipment availability. They may not be able to participate in regular fitness training by means of weightlifting or resistance training. Depending on their job requirements or role, they may still have the abilities to perform physical activity. It might not be an organized strength and conditioning program; however, movement is still taking place, and it can elicit adaptations in the cardiovascular and muscular systems.

When given the opportunity to follow an organized strength and conditioning program, one can experience general improvements in speed, strength, flexibility, mobility, endurance, and coordination (38). Therefore, it is important to integrate the foundational movements patterns, such as the squat, hinge, lunge, push, pull, carry, and rotation, into any programming routine (Figure 2). These foundational movements will help optimize overall movement quality during the line-of-duty. Additionally, it is important to prepare the body for any upcoming demands, whether known (e.g., a situation that is predetermined upon arrival) or unknown (e.g., a situation that is not known or changes upon arrival). Examples of these situations are forceful scenarios, casualty extraction, pulling over a barrier, breaching, dragging an unconscious person, engaging with an armed assailant, ambush, and other situations (7,12).

Tactical facilitators should adopt a smart training approach that addresses weaknesses by utilizing a needs analysis. Additionally, training should include components of force and velocity development (i.e., fast and slow movements), muscle tissue overload (i.e., progression overload), variations of joint range of motion (e.g., full and half range of motion movements), planes of motion (e.g., sagittal, frontal, and transverse planes), different muscular contractions (e.g., isometric, eccentric, and concentric contractions), and stability focus (e.g., core bracing) to help improve movement quality (39). When TOs can address their weaknesses in programming, they can typically expect an enhancement upon their training struggles over time. Although we encourage TOs to address their weaknesses, this does not mean they should stop training their notable strengths. TOs still need to train their strengths during a regular fitness training routine. This client-centered approach can help improve the structures of injury prevention, while inducing training longevity (39).

TACTICAL SKILLS TRAINING

When it first comes to training, we discussed the importance of fitness training by administering a smart strength and conditioning approach, so injury prevention and longevity are promoted. Building the foundations first will help enhance the fundamentals for the skills needed during occupational tasks. Next, we address the tactical skills training that can be utilized to enhance tactical performance for known and unknown situations.

It is known that TOs can experience situations that require quick responses and reaction times (40). These responses transfer towards the skills needed to be effective in the tactical environment, such as successfully apprehending an assailant.
saving a civilian from a house fire, or defending against terrorism. The authors recommend tactical facilitators and TOs include tactical movement skills, such as visual scanning, reaction, climbing, crawling, dragging, breaching, and aiming (Figure 3), so they can be physically and mentally prepared for known and unknown situations. These movement skills are common throughout emergency, lethal force, or combat situations (41,45). Thus, giving them an excellent reason of why they should be practiced regularly and not neglected in tactical skills training with the practice of fitness training foundational movement patterns. However, depending on the specific roles or tasks of the TOs, these tactical movements skills can be adjusted to see best fit.

RECOVER FROM TRAINING
It is important to understand when an individual's load placed on the body has caused a point of unmanageable fatigue (8). Bartz and Bartz discuss the value of utilizing internal and external load tools to track and monitor an individual’s stress and fatigue (Table 4) (8). When it comes to optimal recovery, individuals need to consider the effects of fatigue on the body and how to appropriately manage it when it occurs (8). Fatigue should not always be considered an enemy to the body (8). Fatigue can be an ally, since it informs us when our body (physiologically and psychologically) has taken on too much and it needs to recover (8). The tools demonstrated in Table 4 can be used in the tactical environment to endorse regulations, management, and adaptations. Tactical facilitators should program appropriately based on the type of TOs they are programming for. Programs need to help combat potential limitations that exist so they can improve their quality of life.

The ability to effectively organize strength and conditioning programs can help avoid undesirable outcomes and enhance tactical skills (1). Managing the loads that are placed on the body can help improve the return of performance and reduce undesirable adaptations. Any stimulus needs to be accounted for, as it places a physiological and psychological load on the body. Fitness training and tactical skills training all have their place in tactical development and can impact the recovery of the TO.

WRAPPING IT UP
As mentioned earlier, recovery is a complex, multifactorial issue (9). It is important to understand that it is a continuous process and the components may need improvement over the course of

| TABLE 4. EXAMPLES OF EXTERNAL AND INTERNAL LOAD MONITORING (8,44,46) |
|-----------------------------|-----------------------------|
| **LOAD TYPE** | **EXAMPLES** |
| External Load | Training or mission times (seconds, minutes, hours, or days)  
Type of training or missions  
Time-motion analysis (Global Positioning Systems [GPS])  
Power output, speed, acceleration  
Neuromuscular function (jump test, isokinetic dynamometry, or plyometric push)  
Movement repetitions (pitch, throws, bowls, serves, jump, or foot contact)  
Distance (kilometers ran, cycled, or swam)  
Acute:chronic workload ratio |
| Internal Load | Perception of effort (rating of perceived exertion [RPE])  
Session rating of perceived effort (session duration (min) x RPE)  
Psychological inventories  
Sleep (quality and quantity)  
Biochemical, hormonal, and immunological assessments  
Psychomotor speed  
Heart rate (HR)  
HR to RPE ratio  
HR recovery (HRR)  
HR variability (HRV)  
Training impulse (TRIMP)  
Blood lactate concentration  
Blood lactate to RPE ratio |
time. Life is full of surprises, and each component might need more attention compared to other days. In other words, some days individuals might experience higher stressors, while other days have less stress. Additionally, a TO might not get the best sleep, but the days prior they had great sleep. The authors encourage tactical facilitators to monitor and track these five components (health, stress, nutrition, sleep, and training) so they can manage the well-being of their TOs to the highest standard.

The presence of qualified tactical facilitators needs to increase in departments and agencies, as they can be the front-line of guiding TOs through enhancements of physical and psychological functions (9). In the world of collegiate and professional sports, athletes have access to empowering resources to improve their recovery (9). However, tactical departments have restrictions on their resources. The lack of resources come from limited budgeting or performance positions within the department. The authors believe TOs should have the resources to become the best version of themselves, and most importantly, utilized to help improve their performance to protect and serve the community.

Research within tactical population is advancing and it is helping shape changes that are needed. Professionals recognize the benefits of enhancing general fitness; however, further research is needed to address the gap between general fitness and tactical abilities (36). As the research grows, we will only see an increase of transferable data to welcome new procedures, techniques, tools, and skills to the table.

REFERENCES
THE COMPONENTS OF RECOVERY FOR TACTICAL OPERATORS


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He enjoys researching different restorative techniques that can be utilized in training to help improve regeneration of the mind and body. Bartz is an Adjunct Faculty member at Saint Xavier University and Oakland Community College. His doctoral dissertation studied law enforcement officers’ startle response times and handgun performance while experiencing a simulated ambush.

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