# Chapter 5

# PSYCHIATRIC PRINCIPLES OF FUTURE WARFARE

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Mario H. Acevedo *The Attack* 1991

Mario H. Acevedo, a U.S. Army Combat Artist deployed to the Persian Gulf, depicts the aerial intensity of American gunships attacking Iraqi armor in the desert. Future warfare may occur in a variety of settings and intensity, ranging from the massive troop and materiel deployments of the Persian Gulf War to small peacekeeping missions. Such rapid and intense combat necessitates flexibility and innovation in the treatment and restoration of combat stress casualties.

Art: Courtesy of US Center of Military History, Washington, DC.

## INTRODUCTION

Historical reviews of psychiatric interventions in past wars allow the exploration of the implications of a range of future combat scenarios.[1–5] A spectrum of combat intensities is possible, ranging from intermittent light-infantry combat (low-intensity conflict) to continuous, highly-mechanized battle (high-intensity conflict), possibly with nuclear, biological, and chemical (NBC) weapons. Whatever the combat intensity, the underlying stresses of dislocation from loved ones and home, the fear of the unknown, and the stresses of an unfamiliar environment will produce disorders of frustration and loneliness. Thus, higher-intensity conflict stresses will be superimposed on stresses associated with low-intensity conflicts.

While the holistic or psychosomatic approach emphasizes the unity of an organism's response to stress, it is convenient to separate factors producing stress and breakdown in battle into physical (or physiological) and psychological (or sociopsychological) categories.

The psychological factors, because they are potentially the ones more amenable to psychiatric interventions, have been emphasized the most in studies of breakdown in battle. Because of the nature of high-intensity, high-technology, and continuous combat, the physiological variables may still play a major role in breakdown in modern wars.

Psychological and physiological variables interact to prevent or promote illness. This can be seen, for example, in frostbite, the first combat psychiatric disorder described in the British literature during World War I.[6] More recently, Sampson[7] has described this interaction between the physiological responses to anxiety, particularly vasoconstriction, and to cold, also a vasoconstriction, when the soldier is immobile, stressed, and lacking in protective clothing. Similarly, the disorganized, immobilized soldier is less likely to attend to proper protective measures such as changing stockings frequently. This interaction of physiological responses to cold and behavioral and physiological responses to anxiety produces a cumulative effect of heat loss in peripheral tissues and thus of frostbite.

A large body of literature has documented the clinical relevance of stress not only to traditional psychiatric disorders but also to such apparently "physical" conditions as infections, cardiovascular diseases, and cancer.[8–10] Many of these deleterious effects of stress seem to be mediated by the neurotransmitter/neurohumoral and immune systems.

Although no one knows precisely what forms future warfare will take, the following possible forms of future warfare and available experimental studies related to combat performance are offered for consideration.

## CHARACTERISTICS OF FUTURE WARFARE

From a historical perspective there appear to be two main groupings of combat stress casualties, which are to an extent dependent on the nature of the soldier's experiences. At one extreme are the disorders of frustration and loneliness (nostalgic casualties) that appear among troops engaged in intermittent, low-intensity combat, and in rear-echelon duties. These soldiers share the problems of anyone who leaves home to an inhospitable environment; they present with symptoms such as alcohol and drug abuse, disciplinary infractions, and venereal disease. Pre-Vietnam drafted soldiers in garrison settings manifested many of these behaviors, and U.S. soldiers in Europe and Korea continue to exhibit them. Terrorist and guerrilla tactics are deliberately calculated to maximize ambiguity and frustration. This provokes misconduct, including excessive brutality and atrocities which will alienate the local population, the home front, and world opinion. For the United States, the Vietnam conflict was the epitome of this type of conflict. Although it could be argued that they were not appropriately utilized, the traditional principles of treatment (proximity, immediacy, expectancy; reassure, rest, replenish, restore confidence) appear to have been less effective with these casualties in Vietnam.

At the other extreme is the high-intensity, high-lethality, continuous combat fought in some battles of World War I, World War II, and early in the Korean conflict, but best seen in the 1973 Yom Kippur War. Such casualties present with symptoms related to anxiety and physical and emotional exhaustion. The traditional principles of treatment, if the vicissitudes of battle allowed them to be used, worked best with these soldiers in the past; how-

ever, the severe stress of future warfare may exert psychological trauma of such severity as to lessen the effectiveness of these principles even if battlefield conditions allow their use.

Being unable to know what type of war the United States will be expected to win in the future, the armed forces must prepare for conflicts ranging from worst-case low-intensity operations other than war to very high-intensity wars. These two polarities will be addressed at this time in terms of psychiatric approaches. If psychiatric casualties can be appropriately treated in these extremes, those of a medium range of intensity should present no insurmountable or unforeseen problems. While future military missions may extend beyond combat, it is reasonable to expect that the combat intensity dimension will include the major varieties of future psychiatric problems.

**Low-Intensity Future Warfare**

A study of world conflicts since the Vietnam conflict would lead to the conclusion that the United States is likely to be involved in more low-intensity conflicts than high-intensity, 1973 Arab-Israeli-type wars. A chemical or biological low-intensity conflict would seem to be improbable, but chemicals have, in fact, most often been used against poorly equipped insurgents or dissidents, as by Spain and France against the Moroccans in the 1920s; by Italy against Ethiopia; by the Soviets or their clients in Yemen, Cambodia, Laos, and Afghanistan; and by Iraq against their Kurdish minority. U.S. forces, especially Special Operations Forces, could be on the receiving end of such weapons under circumstances which would be difficult to document.

In preparing for low-intensity combat stress casualties, there must be an attempt to strengthen ameliorating conditions. These include minimizing family stress, enforcing vigorous discipline in organized camp conditions, setting and enforcing strict but realistic rules of engagement, and promoting unit cohesion and pride in following the rules. At the same time, it will be necessary to eliminate or lessen the impact of aggravating conditions: prevent boredom, prepare for cultural differences, and strengthen social support from the unit, the family, and the community.

Fighting counterterrorist or counterinsurgency conflicts can result in successful outcomes. The British experienced such success in the Boer War in South Africa (1899–1902) and in a war in Malaysia (1948–1960), and the United States successfully put down the Moro rebellion in the Philippines (1902). Critical to these efforts was the use of professional soldiers and the ability to isolate the insurgents from resupply and indigenous support.

In counterinsurgency conflict the forces being allied with must be seen as legitimate to govern by the indigenous population. The U.S. troops optimally will be professional soldiers (and often Special Operations Forces) fighting in cohesive units, thus relatively impervious to the ambiguities universally present in civil wars. However, less frequently trained combat-service-support units, some from the Reserves, may also be deployed. The troop leaders should regularly explain the goals of the fighting and those goals should be explicitly formulated by the Commander-in-Chief. The mental health personnel must have a "mental-hygiene approach," emphasizing productive use of leisure time, and perhaps assisting in building schools and public works projects. Vigorous approaches to eliminating substance abuse and in-country treatment of substance abusers is mandatory. Realistic information about the risks and prophylaxis of venereal diseases should regularly be given by the medical personnel to the troops. Bushard-type counseling,[11] emphasizing *commitment* to the mission and *concurrence* of one's fellow-soldiers, should be readily available to temporarily disaffected or demoralized soldiers. The emphasis must be on current issues and on optimistic appraisal of the soldier's ability to overcome these challenges. Often, the best results occur when a senior sergeant or an officer can take the disaffiliated soldier "under his wing" and offer encouragement and support during a difficult time, a surrogate parenting for an immature personality.

The devastating effects of drug abuse by soldiers in Vietnam is detailed in Chapter 3, Disorders of Frustration and Loneliness. In his novel *1984*, George Orwell[12] suggested that drugs might be utilized to weaken a nation's fabric and assist a foreign power. In 1986, a U.S. Army general reported that communist Cuba was supporting the smuggling of narcotics into the United States, presumably to that end.[13] One of the most alarming terrorism trends in Latin America is the alliance between insurgency groups and narcotics traffickers, particularly in Peru and Colombia.[14] Most of the evidence supports the view that in Vietnam, market factors led to drug trafficking rather than deliberate subversion. However, the potential for such insidious subversion exists.

The mental health implications of drug dependence are obvious, but only recently have government and industry begun large-scale actions to counter the drug-abuse threat that afflicts primarily

the age group most likely to be conscripted in the event of major hostilities. As mentioned, U.S. soldiers were deployed to Colombia to support that government's attempt to disrupt drug trafficking. The military has also assisted the Coast Guard and Immigration and Naturalization Service in guarding the borders against drug importation. Additionally, the U.S. government has used drug screening of personnel. Some industries have also begun such screening.

The senior U.S. Army leadership is aware of the potential stress issues in operations other than war, and is actively collecting data and developing policies and doctrine to control them. This doctrine includes the early deployment of mental health/combat stress control (clinical) teams and human dimensions (research) teams.[15–17] The focus of this chapter, therefore, will be on high-intensity combat, which presents formidable obstacles to traditional treatment delivery. While low-intensity conflicts and operations other than war are more likely than a high-intensity conflict, U.S. forces must be prepared for the high-intensity conflict (ie, a worst-case scenario such as NBC warfare). Even in the absence of NBC warfare, future combat may be sustained, highly intense, highly mobile, and highly technical.

**High-Intensity Future Warfare**

U.S. military forces must prepare for combat of unprecedented ferocity, lethality, and destructiveness. For example, modern combat offensive doctrine calls for continuous operations including conventional, airmobile, and airborne assaults possibly coupled with coordinated chemical strikes (and perhaps nuclear strikes) throughout the depth of the enemy's deployment.[18] Mobile combat groups will attempt to penetrate enemy defenses up to 150 miles, into the defender's rear positions, disrupting command, communications, and logistic activities.[19] Through the use of night vision devices and superior numbers, the attacking forces will fight continuously while allowing adequate rest by rotating spent units. If outnumbered, the defending forces would be engaged continuously,[20] resulting in fatigue and sleep deprivation. If opportunities for sleep did occur, the extraordinarily high noise levels and ground-shaking artillery and bomb blasts might make sleep impossible until the soldier approached physical collapse. This will maximize mental and physical stress on defending personnel and increase combat breakdown. If this seems an implausible scenario for the future U.S. Force Projection military, imagine what it would have been like for the lead U.S. contingency force Army and Marine brigades and divisions if the Iraqi Army in September 1990 had been able to press forward with a full armor attack, supported by their heavy artillery firing chemical shells, while improved Scud missiles dropped chemical, biological, and perhaps, nuclear warheads on the Arabian (and Israeli) ports, airfields, and cities (Exhibit 5-1).

A future regional power (perhaps even one of the current major powers under different leadership turned aggressively militaristic) could be tempted to pull a "high-tech" surprise, counting on an inadequate political and/or military response from the United States. It is conceivable that this could come after a period of economic hardship when the downsized U.S. military services were feeling the effects of decreased funding for maintenance, training, soldier and family benefits, and perhaps shortfalls in weapons research, procurement, and strategic lift capability. All these factors could have resulted in lowered

**EXHIBIT 5-1**

**CHARACTERISTICS OF HIGH-INTENSITY WARFARE**

- High lethality with mass casualties
  - "Disaster-fatigue" casualties
- Continuous combat
  - Sleep deprivation
  - Increased fatigue
- High mobility
  - Radar localization
  - Proportionally fewer forces
- Dispersal of forces
  - Nuclear/biological/chemical threat
  - Infrared/radar "signature"
  - Result of high mobility
- Absence of air superiority
  - Limited helicopter medical evacuation
- Absence of rear battle-free area
  - Limited traditional medical treatment

Adapted from Jones FD. Psychiatric lessons of low-intensity wars. Presented at Army Medical Department Division and Combat Psychiatry Conference, 1984; Fort Bragg, NC.

morale and retention of highly-skilled personnel, and lowered quality of new recruits, putting further strains on leadership and unit cohesion.

Strategically, the attacker in such a major regional conflict will focus on command, control, communications, and intelligence organs. The continuous assault will attempt to disrupt the small combat unit of 3 to 40 persons. Modern military planners are fully aware of the psychological factors in combat. A surprise attack with apparently overwhelming forces could lead to panic and collapse even when the opposing forces are about equivalent in strength. This occurred, for example, during the German blitzkrieg of French forces in 1940; the Israeli surprise attack on Egypt in 1967[21]; and the coalition attack, led by U.S. Forces, on Iraq in 1991. It almost occurred with the Arab surprise attack on Israel in 1973.

Surprise maximizes the psychological effect of an attack. A conventional rolling artillery barrage, finished by a salvo of rockets, need not kill the defenders. It will produce a state of "battlefield paralysis"—the temporary inability to use one's weapon—lasting from 30 seconds to 4 to 5 minutes depending upon the complexity of the weapon.[22] This would allow first-echelon attacking forces to advance immediately behind the rolling barrage with smoke and flame throwers. Their aim would be to pass through or bypass defending units rather than to engage them. First-echelon forces would then proceed rapidly to the rear to disrupt command, control, communication, and intelligence functions; to capture airfields, petroleum depots, and fire-support systems; and to link with airmobile and airborne forces. Second-echelon forces would then neutralize the remaining forward defending units to produce a swift and sudden collapse. NBC weapons, and even long-range improved conventional weapons, enable senior, rear-echelon military and political figures to influence directly the outcome of the battle.[23] Such weapons used against enemy command, control, communication, and intelligence, and nuclear means could paralyze a defending force. The response to such a scenario requires highly-mobile, dispersed forces.

## CHALLENGES TO THE PRINCIPLES OF FORWARD TREATMENT

As discussed in Chapter 2, Traditional Warfare Combat Stress Casualties, the appropriate use of the traditional principles of forward treatment has resulted in the return of about one half to two thirds (or in optimal circumstances up to nine tenths) of combat stress casualties back to combat duty within days. Forward treatment consists of immediate, brief, simple interventions such as rest and nutrition in a safe place as near the battle lines as possible, with an explicit statement to the soldier that he will soon be rejoining his comrades. This approach to treatment also calls for soldiers evacuated rearward to be screened at a central collecting point from which they may still be returned to duty if further rearward movement is inappropriate.

In practice, this approach has required four essential elements:

1. A relatively safe and stationary place near the battle area (refuge);
2. A treating person (therapist) or team;
3. Time and resources for restoration of physiological needs (rest); and
4. A method for returning to one's unit (return).

Each element is critical to the process; and, as will be seen, each is jeopardized by modern, high-intensity warfare. High-intensity future warfare, therefore, challenges the application of the traditional principles of forward treatment (Exhibit 5-2). There may be no safe and stationary forward treatment area, because high technology has resulted in weapons and surveillance systems capable of discovering aggregations of personnel through the infrared "signatures" given off by heat radiation from groups of persons and their supporting machinery (eg, trucks, generators). Furthermore, rear areas may be preferentially attacked because they may be more vulnerable than front-line forces, which will be dispersed, camouflaged, and mobile.

Even if methods are found to shield and protect rear-area installations, the time needed to restore physiological and emotional needs, plus transportation limitations, will make it difficult or impossible to return the soldier to his own unit. This is because combat units must remain dispersed and highly mobile to avoid being targeted by their "signatures." However, studies from World War II and Korea make it clear that the returning combat stress casualty must rejoin his own unit or risk becoming a casualty again. Furthermore, the possible absence of local air superiority by U.S. forces will aggravate the difficulty of evacuation and return of casualties arising from dispersion and mobility of forces.

**EXHIBIT 5-2**

**NEGATION OF PRINCIPLES OF FORWARD TREATMENT**

No refuge:
- Absence of rear battle-free area

No therapists:
- Dispersal of forces
- Mass casualty situation (triage)

No rest:
- Absence of rear battle-free area
- High mobility
- Lack of time to treat

No return:
- Dispersal of forces
- High mobility

Adapted from Jones FD. Psychiatric lessons of low-intensity wars. Presented at Army Medical Department Division and Combat Psychiatry Conference, 1984; Fort Bragg, NC.

The psychological stresses of high-intensity combat will also be magnified due to the lethality and mass casualty nature of modern warfare. There is usually a direct relationship between wounded in action (WIA) and psychiatric casualties. The U.S. Army medical planning field manuals[24,25] give a conservative estimate of 1 psychiatric to 5 wounded-in-action casualties, but point out that some units in World War II fought battles in which the ratio reached 1:2. Being on defense increases stress casualties relative to wounded. However, being mobile tends to protect. Recent official casualty rate predictions have reduced the average division's daily wounded in action during the heaviest weeks of fighting from about 150 to 50. The U.S. Army does not expect to fight in massed formations with second-rate weapons, suffering mass casualties. However, war is not fought on the average day, and the enemy will not fight every division equally every day. The engaged brigade of an engaged division could easily suffer several hundred wounded out of a total of about 6,000 troops over 1 or 2 high-casualty days. This would result in more than 100 stress casualties arriving at the forward support medical company in the brigade support area over a few days. At least as many stressed soldiers would require special consideration without necessarily being held for restoration in medical units. Considering that rates were as high as one psychiatric to one wounded-in-action casualty in some Israeli and Egyptian units in the first high-intensity, sustained engagement of the 1973 Yom Kippur War, this stress casualty estimate may be too conservative.

Surgical casualties and combat stress casualties in a high-intensity scenario are projected to occur in such numbers that medical resources must utilize the triage principles developed for mass-casualty situations. Triage emphasizes treating first those who have the best chance of survival while postponing treatment of those seriously wounded or lightly wounded. In current civilian triage situations, surgical casualties have priority over psychiatric casualties in the allocation of medical personnel. Combat stress casualties, as the most likely to become effective with minimal intervention, will receive attention from division mental health and combat stress control unit teams. These assets will continue into the future force structure, but that alone is not enough to assure success. They must also be at the critical places on the fluid battlefield. They must be highly trained in peacetime to function in such a high-stress setting in a come-as-you-are war. Will the military be successful in recruiting and retaining psychiatrists, psychologists, and social workers who will enjoy the challenge of being true consultants and members of line units if the job involves this risk? Might it be necessary to train physician assistants for combat psychiatry positions? The plans for far-forward combat stress control in U.S. Army Force XXI are reviewed in Chapter 7, U.S. Army Combat Psychiatry.

If there were a threat of NBC warfare, the rate of stress casualties would rise. Stress casualties which mimic the symptoms of chemical, biological, or radiation injury may exceed the cases of actual injury by 2 or 3 to 1, based on World War I experience. The chemical protective suit and mask (mission-oriented protective posture or MOPP gear) would create heat buildup even in cool climates with excessive sweating and loss of salt and water. Furthermore, to minimize the need to urinate, soldiers in MOPP gear often do not drink fluids. In experiments conducted by Walter Reed Army Institute of Research (WRAIR) personnel,[26] soldiers in MOPP gear were observed to fail to eat and drink in order to minimize excretory functions leading to some degree of urine concentration. Even without MOPP gear, soldiers often do not eat or drink in the early days of combat. During the 1982 invasion of

Grenada by U.S. forces, casualties from dehydration occurred, indicating that U.S. forces need to be alert to this problem. The Israelis have made water drills a standard part of a combat commander's responsibilities, with failure in this area leading to punishment.

While overt heat prostration presents an unambiguous syndrome, the effects of mild dehydration are not so obvious. S.L.A. Marshall,[27] a man exposed to battle during World War I, World War II, and Korea, described the following incident during the strenuous invasion of a Japanese-held Pacific island during World War II:

**Case Study: SLAM Finds Salt**

The sniper fire had intensified.... When their officers got this company going again, I followed along for about a hundred yards into the bush. There, after just a few stumbling steps, I fell apart. My senses reeled. I was hit by such weakness that I dropped my carbine and could not unbuckle my belt, but that was not the worst of it. Within seconds my nerve had gone completely and I shook all over from fear.

I lay flat under a pandanus tree, telling myself: "It's combat fatigue. You've been kidding yourself. You are too old for the wars." Being unable to walk and scarcely able to think, I decided to stay where I was, wait for a stretcher-bearer to come along and get me back to the *Calvert* [ship], where I would stay. For possibly ten minutes I waited.

Before any aid man came my way, a rifleman stopped and stared at me. Then he took a bottle of pills from his jacket pocket and downed a couple of them.

I asked weakly, "What you got?"

"Salt."

"Gimme some. Nothing can make me feel worse than I do."

He gave me the bottle, saying he had another. I washed down eleven salt tablets with the lukewarm water from my canteen as fast as I could swallow. Within the next ten minutes my nerve and strength were fully restored, and I was never again troubled; yet that lesson had to be learned the hard way. No one had ever told me that one consequence of dehydration is cowardice in its most abject form.[27(p68)]

Comment: This vignette clearly demonstrates combat fatigue as a *psychophysiological disorder.*

## RESEARCH STUDIES OF COMBAT STRESS

### Psychological Factors

Combat does not lend itself to experimental studies because most of the variables cannot be controlled; consequently, few studies have been conducted during actual fighting. Perhaps the most extensive study of the stress of combat was done by Stouffer, DeVinney, Star, and Williams[28] during World War II. That study addressed primarily psychological factors and showed that cohesive, well-led units had fewer psychiatric casualties.

During the Vietnam conflict, Bourne, Rose, and Mason[29] obtained, over a 3-month period that included intermittent combat, behavioral data and urine samples from a 12-man Special Forces "A" team assigned in an enemy-controlled area. They found that the 2 officers experienced substantially higher levels of stress than the 10 enlisted men as measured by steroid excretion. It was also noted that on the day of an anticipated attack, an officer and his radio operator (command and communications positions) showed a modest rise in steroid excretion (increased stress) while the other subjects, all enlisted men, showed a drop. These findings (along with clinical observations and theoretical studies by Gal and Jones as discussed in Chapter 6, A Psychological Model of Combat Stress) suggest that assigned role in a group plays a major part in determining stress.

Bourne, Rose, and Mason[30] had also studied steroid excretion and obtained behavioral data on seven helicopter ambulance medics in combat in Vietnam. A surprising finding of the study was that comparison soldiers in basic combat training camps in the United States, as measured by steroid excretion, experienced greater stress than these soldiers engaged in highly dangerous combat operations (such ambulance crews averaged more medals for heroism than combat arms soldiers). They found that these combat soldiers utilized a variety of mental mechanisms to defend themselves from the stress of potential death and mutilation. These mental activities were highly individualized. One man was quite religious, believing that God would protect him. Another soldier, who tended to intellectualize, would make involved mathematical computations as to the probability of his being wounded or killed, would come up with figures indicating a low probability, and would dismiss such a low probability as being insignificant.

Similarly, in the Special Forces team Bourne[29] also found defensive mental operations but in this case the primary mechanism was an overwhelming emphasis on self-reliance, often to the point of om-

nipotence. In an unpublished study of explosive ordnance disposal (EOD) teams, often called "bomb squads," Bourne found similar mental operations used to protect the individual from the stress of potential death and maiming. In EOD personnel the primary defense was a belief that if one followed established procedures in a careful manner, there would be little danger. A sense of omnipotence and of fatalism ("I won't die until it's my time") were also frequent coping mechanisms.

**Combat Role and Sleep Deprivation**

In a simulated combat exercise the importance of leadership and cohesiveness was demonstrated in sustained operations when a good commander prevented soldiers suffering from cold exposure from disrupting his unit while another commander was not so effective.[31] During this same exercise Belenky[32] reported on the importance of physiological degradation of performance, particularly that caused by lack of sleep. He reported that a majority of soldiers deprived of sleep for 72 hours would experience visual hallucinations and illusions. However, the same study revealed that 3 or 4 hours of sleep in a 24-hour period would prevent most of the degradation of cognitive processes.

Johnson and Naitoh[33] have concluded from a comprehensive review of the literature that cognitive processes suffer earlier and more severely than muscular tasks during sleep deprivation. Experimenters at the U.S. Army Research Institute of Environmental Medicine[34,35] have explored the effects of sustained operations on artillery teams in simulated sustained combat. Their findings confirm earlier reports that cognitive tasks requiring abstract judgment, preplanning, and vigilance are degraded early and seriously from sleep loss and cumulative fatigue, while the ability to perform well-practiced, urgent tasks involving motor activity was preserved best.

**Disrupted Circadian Rhythms**

Experimenters at the Naval Health Research Center[36-38] have shown that performance is also related to circadian rhythms that, of course, are particularly susceptible to disruption from travel across several time zones, as would occur in any distant deployment of U.S. forces in an easterly or westerly direction. Abstract tasks such as reading comprehension have been shown to be best performed in the afternoon and evening, while performance speed was high in the morning and steadily fell during the day and evening.[37] In studies of nuclear submariners subjected to an 18-hour work-rest cycle, Naitoh and coworkers[38] found desynchronization of normal circadian rhythms, which could have implications for stress and health.

The situation is even more complicated in that circadian rhythms seem to be regulated by a "deep oscillator," which changes very little despite external changes in sleep cycle, and a "labile oscillator," which is more responsive to environmental changes.[39] The "deep oscillator," which may be reflected in persistent body temperature patterns, is more significant for tasks involving manual dexterity skills, while the "labile oscillator" is more significant for cognitive tasks.

A comprehensive review of the shift-work and jet-lag literature has drawn conclusions on reducing negative effects in the event of overseas deployment of U.S. forces.[40] They note that manipulation of the carbohydrate and protein components of the soldier's diet producing relative increases of serotonin or catecholamine precursors in the brain can result in a drowsy soldier when sleep is appropriate or an alert soldier when this state is appropriate. They have devised schedules not only in terms of optimal work-rest cycles but even appropriate diets of soldiers for sedating or alerting effects. They have suggested, for instance, that a high carbohydrate meal about 1 or 2 hours before sleep is desired will facilitate sleep through the insulin effect, which increases L-tryptophan transport through the blood-brain barrier. This precursor amino acid of serotonin increases serotonergic influence and thus sleepiness. There is increasing evidence that bright light exposure to the retinae can reset the circadian cycle. This can be accomplished by having the individual exposed to bright light in the new morning and decreased exposure at the new night, perhaps by wearing dark sunglasses.

**Implications for Future Combat**

Future commanders must maximize their soldiers' fighting ability and resistance to breakdown by insuring that the physiological needs of their soldiers are met. This involves a sensible doctrine of rest and sleep (at least 4 h sleep in a 24-h span), prevention of cumulative fatigue (by rotation from combat, preferably as a unit to maintain cohesion), adequate nutrition (especially fluids and salt), and frequent changes of socks to prevent frostbite in cold weather and fungal infections in hot weather. When initiating combat, U.S. commanders should seek to attack at a time when their sol-

diers' normal circadian rhythms are at a peak. For example, soldiers flown from the East Coast of the United States to fight in the Middle East could take advantage of the time zone dislocation by napping on the overseas flight and attacking at 0300 hours Persian Gulf time, physiologically early evening time for U.S. forces; and, for alertness, the lowest ebb of the biological tide for enemy soldiers accustomed to rhythms appropriate for the Persian Gulf region.

Future combat will also require close attention to psychosocial factors and revision of the principles of combat psychiatry. Because stress casualties have typically peaked among troops initially exposed to combat, prevention of these casualties will be critical to the outcome of a war of short duration. In addition to leadership and cohesion factors discussed previously, there is a need for ongoing educational efforts to minimize the effects of expected surprise attacks by the enemy. As mentioned in the Desert Rock studies discussed in Chapter 4, Neuropsychiatric Casualties of Nuclear, Biological, and Chemical Warfare, those soldiers most knowledgeable about nuclear explosions were least frightened. This need to educate soldiers should not only include the usual battle and NBC scenarios but also the possibility of atypical scenarios. By being familiar with such scenarios, the psychiatrist will be able to educate commanders concerning expected psychological reactions and potential interventions.

## PRINCIPLES OF COMBAT PSYCHIATRY FOR FUTURE WARFARE

Because high-intensity warfare may make implementation of the traditional principles of combat psychiatry unworkable, new principles of treatment must be developed (Exhibit 5-3). It is obvious that preventing these casualties from occurring in the first place is the preferred course of action; however, this may be difficult given the intensity of warfare. Studies[41–44] have repeatedly shown that stress casualties occur in direct proportion to combat intensity and certain physical and morale factors. Factors tending to prevent such breakdown include the absence of fatigue, presence of good leadership and its consequence, unit cohesion, confidence of the soldiers in their weapons and in themselves, and an advancing or retreating military posture. Conversely, the negatives of these factors would promote psychiatric breakdown. Continuous, high-intensity warfare may prevent sleep and rest, thus producing fatigue and promoting breakdown. Dispersion will interfere with the ability of commanders to lead and may prevent the aggregation of comrades, impeding cohesion.

In the 1973 Yom Kippur War, an exemplar of a conventional high-intensity war, some of these factors were not appreciated. The hastily assembled (therefore less cohesive) Israeli forces were exposed to conditions of continuous, high-lethality warfare. Estimates[45] of Israeli acute psychiatric casualties were reported as between 30% and 50% of total casualties in some units. According to Egyptian military psychiatrists, the Egyptian psychiatric casualties at least equaled the "surgical";[46,47] that is, they were at least 50% of the total.

After the 1973 Yom Kippur War there was a concerted attempt by the Israelis to prevent future stress casualties; however, in the 1982 Lebanon War, which was not of as high intensity as the 1973 war, the percentage of acute psychiatric casualties is reported as 23%, mostly occurring during 2 weeks of active combat.[48] (A larger number of delayed and chronic post-traumatic stress disorder cases have

**EXHIBIT 5-3**

**PRINCIPLES OF COMBAT PSYCHIATRY IN HIGH-INTENSITY WARFARE**

Prevention:
- Unit cohesion
- Realistic training
- Doctrine of rest and nutrition

Battlefield treatment:
- Limited evacuation of psychiatric casualties
- Treatment in the midst of battle
- Emphasis on buddy care: Reassurance, Expectancy

Use of drugs:
- Nonsedating antianxiety drugs
- Nondepleting stimulants to reduce fatigue
- Reversible sleep and alerting agents

Adapted from Jones FD. Psychiatric lessons of low-intensity wars. Presented at Army Medical Department Division and Combat Psychiatry Conference, 1984; Fort Bragg, NC.

surfaced subsequently.[49]) It appears likely, then, that the United States must be prepared either to treat significant numbers of acute stress casualties in the event of a future war or to develop more effective methods of prevention. The most cost-effective approach would emphasize prevention.

**Prevention**

The chronology of combat stress breakdown was clearly described by Swank and Marchand.[50] It appeared that there are two groups of soldiers prone to become psychiatric casualties: those never before exposed to combat and those exposed to combat for a prolonged period of time. Swank and Marchand depicted this finding in a chronological chart of combat efficiency. Initial exposure finds low efficiency and high casualties. Efficiency improves after a few weeks with fewer casualties but again declines after 6 to 8 weeks of combat with increased casualties.

During the Korean and Vietnam conflicts the main preventive measure for prolonged exposure casualties, based on World War II experience, consisted of limiting the period of exposure to combat to prevent cumulative stress. Thus, the combat tour in Korea was 9 months and in Vietnam it was 1 year. In the absence of a lengthy war and with the probability of brief, intense future combat, the military has more recently focused on preventing the initial or "green troop" casualties. To do this the U.S. Army has initiated a number of programs to strengthen unit cohesion. This approach in recent years resulted in keeping commanders with the same unit for 18 months or more and in the COHORT (cohesion, operational readiness, training) Program of keeping groups of soldiers together from the time of basic training through assignment overseas. However, this program has largely been abandoned because of the administrative difficulties it creates. Confidence in weapons and selves is being achieved through an emphasis on physical fitness and realistic weapons training. This training is accomplished in part through use of laser "hits" in simulated combat, live-fire exercises, and realistic simulated combat exercises at the Combat Training Centers. A more exotic approach to prevention might consist of the use of performance-enhancing and anxiety-blocking pharmaceuticals, which the author will discuss later.

**Battlefield Treatment in High-Intensity Warfare**

In view of the problems posed by high-intensity combat for traditional treatment procedures, the original World War I principles of combat psychiatry must be revitalized (see Exhibit 5-3). The original concept for the care and evacuation of "nervous" and "mental cases" at the division level was stated in September 1918 as follows:

> 1. Each division in the area has a division psychiatrist who will be stationed at the triage [ie, the ambulance transfer point] when his division is engaged. There he will sort all nervous cases, returning directly to their organizations those who should not be permitted to go to the rear and resting, warming, feeding, and treating others, particularly exhausted cases, if there is opportunity to do so.
>
> . . . .
>
> 2. The advantages of these provisions for dealing with war neuroses and allied conditions in the divisions are:
>
> (a) Control over the evacuation of cases presenting no psychoneurotic symptoms.
>
> (b) Speedy restoration and return to their organizations of those in whom exhaustion is the chief or only factor.
>
> (c) Cure of mild psychoneurotic cases by persuasion, rest, and treatment of special symptoms at a time when heightened suggestibility may be employed to advantage instead of being permitted to operate disadvantageously.
>
> . . . .
>
> (f) Creating in the minds of troops generally the impression that the disorders grouped under the term "shell shock" are relatively simple and recoverable rather than complex and dangerous, as the indiscriminate evacuation of all nervous cases [suggests].[51(p309)]

Prevention and treatment must merge in a modern approach to managing stress casualties. Evacuation of stress casualties must be strictly limited. Becoming a stress casualty would, therefore, not result in an "evacuation syndrome."[31] Many stress cases, however, would still exist. The primary treating persons must be the soldier's fellow soldier ("buddy"), medic, squad, and platoon leader. If soldiers are too ineffective to remain in their squad or team, the next option is to rest them for a night or two in their battalion's headquarters and headquarters company (the "field trains" from which the maneuver companies receive their nightly resupply of ammunition, fuel, water, and food). Treatment would consist of reassurance, replenishment, expectancy, and possibly administration of a nonsedating antianxiety pharmaceutical.[52] This

would be monitored by the unit medic, physician assistant, or circuit-riding mental health officer and NCO. These mental health/combat stress control teams are already called for in current doctrine[25] provided by the division mental health section or the supporting combat stress control detachment.

In the future, the team might have a HMMWV (high mobility multipurpose wheeled vehicle) ambulance or armored personnel carrier in which they could provide mobile evaluation and restoration. For the soldier who appeared fatigued or depressed, nondepleting stimulants might be given. (A nondepleting stimulant is one that does not deplete the neurons of their neurotransmitters. Such depletion, which occurs, for example, with amphetamines, eventually results in rebound fatigue and depression as well as the dangers of heart arrhythmias and psychosis. Currently the amino acids L-tyrosine and L-phenylalanine come closest to being nondepleting stimulants. These can be defined as a "nutritional supplement," not drugs.) Only the small number of most impaired or diagnostically complex cases would be held for observation and restoration treatment by the combat stress control team's psychiatrist (or psychiatric physician assistant) at the forward support medical company, usually several kilometers from the battalion's headquarters companies. Because of the requirement for extreme mobility, this restoration might be provided in suitable vehicles, with built-in physiologic monitoring, biofeedback, and audio-video relaxation equipment. Such vehicles could be used for the prophylactic maintenance and enhancement of combat performance, as well as for restoration of soldiers who had already become stress casualties. Finally, there is growing evidence that the judicious use of pharmaceuticals may enhance combat performance and possibly prevent some forms of combat breakdown; therefore, the issues of the sanctioned use of drugs in combat will be discussed.

**Ethical and Practical Issues Concerning Pharmaceuticals**

The use of pharmaceuticals to sustain or enhance performance in combat is controversial. It raises important ethical and practical considerations. The U.S. government declared a war on drug abuse in the 1980s. As part of that effort, the U.S. armed forces have been assigned missions of drug interdiction overseas and on United States' borders to reduce the production and importation of illegal drugs.

The abused drugs include stimulants (cocaine, amphetamines) which are addictive because they produce (in high doses) feelings of intense well-being, power, alertness, endurance, and aggressiveness (as well as other less common but major psychiatric disorders). The abused drugs also include "depressants" (alcohol, barbiturates, benzodiazepine tranquilizers) which calm anxiety and produce feelings of well-being or promote sleep, as well as producing a drunken euphoria, dependence, addiction, and other negative effects. The narcotic painkiller drugs are abused because they produce a blissful euphoric state. Anabolic steroids are abused by body-builders and athletes because they increase muscle mass, strength, and endurance. They are banned in competitive athletics because they unquestionably increase speed, strength, power, and endurance, although at a potential (rare) cost of medical and psychiatric complications including violent attack behaviors ("'roid rages"). If the United States has declared war on drugs, how can it possibly justify prescribing similar drugs to American soldiers for use in combat?

The obvious answer in favor is that war is not a competitive sport. It is bound by the International Laws of War, but not by Olympic committee rules. Battles are fought by the nation's soldiers, at risk of death, to win the nation's military, and ultimately political, objectives. In such an environment it is necessary to give American soldiers every safe, feasible, and competitive advantage.

But are such drugs safe, especially in the highly unpredictable and unstable physical, logistical, and emotional context of combat? That question requires an empirical, not a philosophical, answer. All drugs are potentially double-edged swords. All will have side effects and overdose effects. Some may produce additional effects upon withdrawal or elimination of the drug. Some interact dangerously with environmental factors, diet, other drugs, or specific diseases. All drugs may have idiosyncratic effects on some individuals. It is unwise to dispense any drug lightly, without first evaluating the recipients and briefing them (and their support group) on what to expect and what to be alert for. It is then wise and ethical to follow them up periodically. For these reasons, any use of pharmacologic agents should be kept under appropriate medical supervision if not necessarily medical control.

After analysis of the risks, some drugs may be judged safe enough for "over the counter," self-administered use. Other drugs may be judged safe for routine prescription use with periodic follow-

up. Other drugs still may be so risky that they should be prescribed only in urgent, carefully defined situations. Like some medications used in treating highly lethal diseases, it may be reasonable to accept even a high risk of injury from the drug if there is little chance that the "patient" can live past the next week without it. Such situations can arise in war as well as in the emergency room.

Of course, if such a drug is administered as a calculated risk and if the soldiers do survive, the uniformed services owe it to them to provide long-term follow-up, and treatment or compensation for any complications of the therapy that may arise.

But will the parents and spouses of America tolerate soldiers being given drugs to induce them to risk their lives and possibly die? It is no longer doctrine to intimidate an enemy into surrender by the sheer bravery of American fighting forces. Rather, the intention is to "fight smart," using superior weapons and information technology on the future "digitized battlefield" to attack the enemy when he is much less capable of striking back.

The effective use of those sophisticated weapons systems requires keeping the operators' brains and bodies in fine tune. The continuous operation doctrine of the U.S. military demands initiative, agility, synchronization, depth, and versatility. Those battlefield imperatives task precisely the higher mental functions in all soldiers, from general officer to private, which are most susceptible to deterioration from sleep-loss, dehydration, fear, sensory overload, or sensory deprivation. If synchronization fails, American "high-tech" weapons kill other Americans or innocent noncombatants. If pharmacologic agents (or other technical solutions such as sensory stimulation, relaxation, or biofeedback) can help more than harm, should they not be used?

It is desirable to develop in U.S. soldiers such high levels of unit cohesion and patriotism that they will be willing, if necessary, to risk sacrificing themselves to save their buddies and accomplish the mission. However, it is not desirable to have anyone in the various weapons systems "high," "spaced out," or indifferent to his own safety. If a drug can help them sustain unit cohesion, good training, and good sense in the face of otherwise overwhelming fatigue or arousal, with an acceptable risk of other harmful effects, is it ethical to withhold it? The overriding question is whether the drug can be taken with an acceptable level of risk both for the mission and the soldier. That will require research, which will not be easy to accomplish.

**Use of Pharmaceuticals in Combat**

Undoubtedly alcohol was the first drug to be utilized to enhance combat performance. When Holland became a major source of gin, the widespread use of this alcoholic beverage by soldiers led to the expression "Dutch courage" to express the desired effect. The ancient Assyrians, Egyptians, and Greeks reportedly utilized opiates before and during battles to sustain or enhance bravery and courage.[53] Other drugs studied or used to enhance combat performance include ergot alkaloids, cannabis, amphetamine and other stimulants; Dramamine and other antihistamines; benzodiazepines; and L-tryptophan. It is the author's contention that the most extensive modern use of performance-enhancing drugs occurred among Soviet personnel during World War II shortly after amphetamine was synthesized. Amphetamine was useful not only to stave off fatigue and drowsiness but also to improve memory and concentration, particularly among Soviet pilots.

During the Vietnam conflict, methylphenidate (Ritalin) and sometimes dextroamphetamine (Dexedrine) were standard issue drugs carried by long-range reconnaissance patrol (LRRP) soldiers. The LRRPs found the most efficacious use to be upon completion of a mission when fatigue had developed and rapid return to the base camp was desirable. Other than mild rebound depression and fatigue after the drug was discontinued, no adverse effects were reported. Other investigators[54,55] studying the drug abuse problem later in the Vietnam conflict reported problems with abuse of these stimulants. Although there was no documented abuse of the morphine Syrettes, commanders suggested such abuse might be occurring,[56] causing them to be withdrawn from the soldiers.

Sedatives have also been studied as a method to improve performance in anxiety-producing situations such as paratroopers making low-altitude jumps or for reducing the emotional tension of young soldiers during the firing of guns.[57] Reports of improved target accuracy through use of the ß-adrenergic blocker, propranolol, and the anxiolytic, diazepam (Valium), have resulted in a U.S. Army ban on use of these drugs by soldiers engaged in marksmanship competition because they would confer an unfair advantage.

In the Vietnam conflict, neuroleptics (antipsychotic or major tranquilizer drugs) were widely utilized for psychotropic effects but benzodiazepines were also used. In the 1982 Falkland Islands

War, temazepam (Restoril) and triazolam (Halcion) were prescribed by the Royal Air Force (RAF) psychiatrist to British pilots on Ascension Island to ensure adequate sleep between the very long, multiple refueling flights to the Falklands and back.[58,59] Triazolam (Halcion) has been studied in U.S. Army field trials.[60] Recent benzodiazepine receptor research suggests ways that these drugs could be used carefully in combat settings not only to alleviate fear and anxiety but also as hypnotic and alerting agents.

### *Benzodiazepine Receptor Studies*

Four functions mediated by benzodiazepines have been discriminated:[61,62] (1) antianxiety (anxiolytic), (2) anticonvulsant, (3) muscle-relaxant, and (4) sedative-hypnotic functions. A fifth possible effect, blocking panic, is relatively weak. Of drugs available on the U.S. market, a number of primarily antidepressant medications (eg, tricyclics and monoamine oxidase inhibitors) appear to have greater antipanic effects.[63,64] It is believed that these exert their effects by potentiating the inhibitory effects of γ-aminobutyric acid (GABA), which in turn is the neurotransmitter of 30% of the inhibitory synapses of the brain.[65] A careful modification of the molecular structures involved has resulted in the synthesis of experimental drugs that can act as agonists or antagonists of all four of the functions mediated by benzodiazepines. This selectivity suggests numerous clinical and military applications including both the prevention and treatment of combat stress disorders and enhancement of performance in certain circumstances.

As mentioned in Chapter 2, Traditional Warfare Combat Stress Casualties, the most consistent symptom of combat stress, whether occurring early in exposure to combat or after cumulative exposure, is anxiety. Such anxiety may be manifested by fear, hysterical conversion or dissociation, tremors, and similar symptoms. In the past, these conditions have been treated with sedatives ranging from chloral hydrate and bromides in World War I to barbiturates in World War II and even self-prescribed alcohol, cannabis, and heroin in Vietnam. These drugs often not only produced unwanted sedation but also decreased the probability of return to combat due to the fixation of a sickness role suggested by taking medication. Based on their experience in 1973, the Israelis promoted a policy prohibiting forward use of medications and even hypnosis.[66]

A drug, however, which would selectively reduce anxiety without diminishing mental or physical alertness and efficiency would go a long way toward "curing" the usual battle fatigue syndrome. To some extent this occurred in the Vietnam conflict when physicians treated psychophysiological symptoms of fear and anxiety with neuroleptics and antianxiety agents.[67] In Johnson's 1-month, mid-1967 survey, physicians' prescribing experience, when generalized to the entire troop population, gave an estimated prescribing rate of 12.5% per year of the assigned U.S. Army troops. Compazine, a major tranquilizer, accounted for 45% of prescriptions made by nonpsychiatrists, mainly used to treat gastroenteritis. Most of the 56 cases of battle fatigue reported in Johnson's study were treated with major tranquilizers (64%), particularly chlorpromazine (Thorazine). The neuromuscular, autonomic nervous system, and cognitive impairments produced by this drug make it a particularly questionable choice on the battlefield.

### *Future Sanctioned Pharmaceutical Use*

The following discussion is offered to stimulate consideration of the potential uses of pharmacologic agents in combat. It does not reflect current official policies.

The ideal drug to treat combat stress breakdown would be an easily administered, stable compound that would reduce anxiety without significant neuromuscular or cognitive impairments, would be nonaddictive, and would permit an appropriate response to danger. Such a drug is not currently available in the U.S. market, but drugs selectively preventing severe anxiety without sedation are being studied, and they raise the possibility of developing a combat-appropriate drug.

Other drugs for selected purposes may also be developed. A drug with a short duration of effect reversible by an antagonist could prove to be a most useful battlefield hypnotic. Such antagonist drugs, primarily affecting the benzodiazepine receptor, are already in the experimental stage[61,62] and one, the benzodiazepine antagonist flumazenil (Romazicon) is commercially available. This drug, currently used in surgical procedures, could be given to a soldier who had received a short-acting benzodiazepine, to bring him awake quickly (within minutes to an hour) if it were necessary for him to resume critical duties.

Studies indicate that buspirone (BuSpar) relieves anxiety without producing cognitive impairment both in acute and chronic use and even in the presence of alcohol.[68,69] In fact, buspirone actually appeared to improve psychomotor skills in alcohol users.

Buspirone is now available in the United States. It has the advantage of causing no psychomotor impairment and no muscle relaxant or sedation effects greater than placebo. Vigilance tasks are improved by a slight alerting effect. Addiction potential seems low because there is no euphoriant effect, and a single large dose (40 mg or above) produces dysphoria. Patients have been given daily doses of over 2 g. One possible drawback is that, as part of its antianxiety effect, it also decreases anger and hostility, but it is arguable that cool professionalism is better than rage when operating modern weapons systems. A more important drawback is a latency or delayed-action period of about 10 days before the anxiolytic effect develops. The latency of anxiolytic effect also seems to occur with the benzodiazepines; however, their immediate sedative effects mask this latency effect.[70] The latency of effect need not limit buspirone to a prophylactic use in soldiers with preexisting anxiety disorders or undergoing reconditioning treatment for return to combat after being evacuated for battle fatigue. Key individuals or whole units could, hypothetically, be placed on buspirone 10 days prior to starting their rapid deployment standby mission cycles, and taken off at the end of the cycle. Buspirone has no adverse withdrawal syndrome.

Because certain individuals are vulnerable to panic attacks during episodes of heightened arousal such as combat, the use of antipanic agents might be appropriate in such individuals. Estimates of the incidence of panic disorder (repetitive, spontaneous panic attacks) range from 1%[71] to 6%.[63] At least two million Americans are thought to be afflicted. Because 25% of first-degree relatives of those with panic disorders are also afflicted in lifetime incidence and there is high concordance in monozygotic twins, a hereditary vulnerability has been postulated. In over two thirds of such patients, the attack can be brought on by infusing 10 mL/kg of 0.5 molar sodium lactate solution in a 20-minute time period. A simpler method of provoking panic in a vulnerable person is to have him or her hyperventilate. In periods of constrained manpower availability, those thought to be suffering from panic disorder who are otherwise fit for combat might be treated with antidepressants that block panic attacks. Antidepressants with minimal sedative side effects would have to be selected. The original monoamine oxidase inhibitors which are most effective as antipanic drugs are excluded because of the dietary restrictions against foods containing tyramine which trigger hypertensive crisis. A new class of monoamine oxidase inhibitors, RIMAs (reversible inhibitors of monoamine oxidase-A) do not have this problem. Imipramine (a tricyclic antidepressant) has too many anticholinergic side effects to be safe in most combat environments. The selective serotonin reuptake inhibitors have fewer side effects and may be demonstrated effective for panic disorder.

In summary, for millennia soldiers have utilized alcohol and other drugs to relieve the stresses of war. The time may now be opportune for the use of specifically tailored pharmaceuticals for these purposes without risking the dangers or decrements experienced in the past.

Thus, the revitalized principles of combat stress treatment involve maximizing preventive efforts and treating in the combat unit. This treatment approach eliminates stress reactions as methods to escape combat (evacuation syndromes), would obviate the need for large numbers of medical resources to treat such casualties (thus allowing them to treat surgical cases), and reduces the problems of returning soldiers to their own units.

The costs of this approach will be increased numbers of "psychosomatic" cases, inappropriate treatment of some misdiagnosed cases, and, perhaps, increased death rates among treated cases. As described above, this scenario is developed around one extreme of future combat, the high-intensity, possibly NBC, war. Lesser-intensity wars will call for varying degrees of traditional interventions depending on intensity.

## SUMMARY AND CONCLUSION

This historical review of psychiatric interventions in past wars has explored the implications of a range of future combat scenarios. The spectrum of combat intensities ranges from intermittent light-infantry combat to continuous, highly-mechanized battle, possibly with nuclear, biological, and chemical weapons. Being unable to predict what type of war the United States will fight in the future, the armed forces must be prepared for both extremes. If psychiatric casualties can be appropriately treated in these extremes, those of a medium-range of intensity should present no insurmountable or unforeseen problems. Likewise, the military will be prepared for those future military missions that

extend beyond combat into areas of peacekeeping or humanitarian relief. However, even in these scenarios it is reasonable to expect that the combat intensity dimension will include the major varieties of future psychiatric problems.

In preparing for the extreme of low-intensity combat and the stress casualties associated with it, there must be an attempt to strengthen ameliorating conditions by minimizing family stress, enforcing vigorous discipline in organized camp conditions, setting and enforcing strict but realistic rules of engagement, and promoting unit cohesion and pride in following the rules. At the same time, it will be necessary to eliminate or lessen the impact of aggravating conditions: prevent boredom, prepare for cultural differences, and strengthen social support from the unit, the family, and the community.

High-intensity future warfare, in particular, challenges the application of the traditional principles of forward treatment because there may be no safe and stationary forward treatment area due to new weapons and surveillance systems capable of discovering aggregations of personnel. Also, rear areas may be easier to target because they are less dispersed, camouflaged, or mobile than front-line forces. Whatever the combat intensity in the future, the well-known stresses of dislocation from loved ones and home, the fear of the unknown, and the stresses of an unfamiliar environment will produce disorders of frustration and loneliness. Thus, the promotion or prevention of psychiatric morbidity will have significant implications for training and operational procedures in future warfare. Particular attention should be given to the interplay of physical and psychological variables in the prevention of combat stress reaction. Obviously, water and sleep drills should become standard in training scenarios. Perhaps not as obvious is the fact that, if feasible, planning sessions for combat should be held at the optimum time in the circadian cycle for highly complex and abstract cognitive tasks. For the soldier who is not experiencing a time zone dislocation, this would probably be in the afternoon and evening rather than in the early morning. Optimal times might also be considered in attacking the enemy. Troops who have rested during a transatlantic flight with proper planning could arrive at a battle at an optimum circadian period for themselves and at the least optimal period for an enemy. The enemy, of course, might not be so accommodating in allowing U.S. forces to prosecute the war on a favorable timetable.

It must be remembered that men have definite physical and emotional limits. A future war will produce levels of stress that unless prepared for in advance, will easily exceed these limits. Through thorough preparation and a sensible doctrine of human physical and emotional limits, a country can hope to deter war but, nonetheless, it must be prepared to fight and win if necessary. It is not enough that the medical community be aware of the limits of human mental and physical endurance in combat; the line commanders must be equally aware and be prepared to shape doctrine to conform to these human needs.

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