A Physical Therapist Experience, Observation, and Practice With an Infantry Brigade Combat Team in Support of Operation Iraqi Freedom

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ABSTRACT  Background: In 2005 the first physical therapists were employed in direct support of infantry brigade combat teams (BCTs) during a combat deployment. The initiative sought to bring soldiers direct access to specialized musculoskeletal care at the places they work and live. The goal was to prevent deferment of care for injuries that may become chronic and to decrease medical evacuations for orthopedic nonbattle injuries by locally providing acute and definitive management. Purpose: To describe the experience of a newly authorized physical therapy role in direct support of an infantry BCT in Iraq during Operation Iraqi Freedom (OIF). The practice patterns, observation, and utilization of the physical therapy team are reported, to include demographics, injury prevalence, and outcomes. Discussion: Physical therapists should be part of the risk management team and advise unit commanders on injury-prevention strategies in a combat setting.

INTRODUCTION
Physical therapists (PTs) have been successful providing effective direct-access care for musculoskeletal pathology in the military for several decades. They had a broad scope of service during World War II and the Korean War, and then in the Vietnam War their role increased to that of physician extenders, precipitating later success in the gulf conflict during Operation Desert Storm. The significance of their role has been further demonstrated during peacekeeping operations such as Bosnia, where their presence led to a decrease in the rate of medical evacuations and an improvement in return-to-duty rates for musculoskeletal pathology. In late 1998, PTs became an integral part of ranger battalions, after their presence produced a decrease in injuries, improved return-to-duty rates, and decreased access-to-care times. These successes contributed to subsequent assignment of physical therapists to Special Forces units. PTs currently serve as integral members of all of these units.

The doctrinal mission of an Army PT is to work as a primary care provider for patients with musculoskeletal problems within the hospital, but during stability and support operations they may also be employed outside of the hospital setting. Written doctrine states that prompt evaluation and treatment of musculoskeletal injuries by PTs enhances healing, expedites return to duty, and helps prevent evacuation out of the area of operations (AO). Additionally, they can serve as health, fitness, and injury prevention consultants to individual patients, units, and commanders. PTs play an important role in the prevention, evaluation, and treatment of neuromusculoskeletal conditions serving as physician extenders in garrison and in a deployed environment.

In the United States Army, the historical responsibility of a PT during times of conflict has been to support a combat support hospital (CSH), which is currently the highest level of medical support within the theater of operations (level III) in Operation Iraqi Freedom (OIF) in Iraq and Operation Enduring Freedom (OEF) in Afghanistan. They also play a crucial role in the rehabilitation of wounded service members (SM) outside the theater of operations at level IV and V facilities (Fig. 1). Other responsibilities include providing treatment for orthopedic-related “nonbattle injuries” (NBI), which make up the majority of injuries in a combat setting and cause the most evacuations out of theater.

The levels of medical care along with their assets have been previously described in detail in the literature. Whereas physical therapy management outside of the combat theater at levels IV and V is characterized by a spectrum that includes nonsurgical orthopedic consults sent to the CSH (level III) in Operation Iraqi Freedom (OIF), physical therapy has been primarily situated at the CSH (level III). Services at the CSH include providing care for musculoskeletal complaints, as well as seeing the majority of nonsurgical orthopedic consults sent to the CSH. However, the capabilities of the physical therapy team to provide rehabilitation services and follow-up care is often limited to SMs in close proximity of the CSH or for very short-term care of SMs on other operating bases that are able to convey to the CSH on a limited basis. For care of nonurgent conditions, the risks associated with convoys can limit the amount of routine visits to the CSH for rehabilitation.

In mid-2005, the first PTs were employed in direct support of a brigade combat team (BCT) as members of the level II medical care team, and have since become organic assets. The philosophy was to provide care to regular SMs at the places...
they work and live. This initiative brought specialized musculoskeletal care to the SM that they might otherwise avoid by bypassing the hazards of traveling to other locations on the battlefield for medical care that is instrumental to their combat readiness. Improving return-to-duty rates in SMs with NBIs in theater by managing chronic pain and injuries in a forward-deployed setting has been shown in other studies. Before this reorganization of physical therapy assets in the battle space, many SMs with NBIs that had rehabilitation potential would likely be evacuated from their unit to the CSH (level III) and then possibly out of theater for further evaluation and/or treatment.

The purpose of this article is: (1) to describe the practice patterns, utilization, and observations of a physical therapy team supporting an infantry BCT during OIF and (2) to report relevant patient demographics, injury prevalence, and outcomes during a 12-month deployment.

**ROLE OF BRIGADE COMBAT TEAM PHYSICAL THERAPIST**

In December 2005, the 4th BCT from the 4th Infantry Division (mechanized) was deployed to Iraq in support of Operation Iraqi Freedom. The unit was assigned a physical therapist for the first time. The physical therapist also came with a credentialed technician who assisted the PT with providing interventions to patients, filling the role of a traditional physical therapy assistant (PTA). The assigned PT and his technician were among the first group of BCT physical therapy assets to be part of a level II medical care unit for an entire course of deployment, from predeployment training and readiness, through the redeployment back to the continental United States (CONUS) after the combat tour. They were attached to the brigade medical support company (BMSC). Their mission was to provide consultation, management, and treatment for all neuromusculoskeletal injuries at medical care levels I and II within the 4th BCT, 4th Infantry Division operational footprint and to provide appropriate referral of these conditions to higher echelons of care. This was performed through consultation from other providers or through direct access. The scope of practice for the level II medical care team was not only limited to personnel within the brigade’s operational footprint but also to injured Iraqi forces or hostile personnel that were brought to any of the brigade’s medical treatment facilities. The purpose of this report is to describe the experience of a newly authorized position for PTs in direct support of an infantry BCT in Iraq during OIF, as well as practice patterns, observation, and utilization, to include demographics, injury prevalence, and outcomes.

**DEMOGRAPHICS**

The patient population that came to the troop medical clinic seeking care was similar to the population that would seek care at most military medical clinical facilities and typically representative of a younger and more active population. It was similar to what has been described as the average NBI SM evacuated out of the combat theater for medical care: a 27-year-old male in need of orthopedic care. Before this reorganization of physical therapy assets in the battle space, many SMs with NBIs that had rehabilitation potential would likely be evacuated from their unit to the CSH (level III) and then possibly out of theater for further evaluation and/or treatment.

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**FIGURE 1.** Physical therapy assets at the different medical levels in the combat theater.

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During this time period, there was a total of 1,362 patient visits to physical therapy, 309 (22.7%) of which were unique patient encounters. These included a total of 33 (2.4%) unique patient encounters that were treated on a separate forward operating base (FOB). The patient encounters for other FOBs in remote locations represent only a 5-month period as it took 2 months at the beginning of the deployment to get established in the main clinic, survey the brigade operational footprint, make travel and equipment arrangements, and perform site visits to determine how best to support each individual mission on that FOB. The average number of monthly physical therapy encounters was 194.6, comprising 39.9 (20.5%) new patient consults, 3.8 (2.2%) direct access visits, and 131.6 (79.3%) treatment and follow-up visits. The new patient consults and direct access visits were those patients that were evaluated for the first time. The clinic treatment appointments included visits for modalities, manual physical therapy procedures, and manufacturing of orthotics. The rehab appointments in the gym consisted of individualized rehabilitation programs or participation in a supervised group program such as a core stabilization class for low back pain or lower extremity functional strengthening for ankle and knee overuse injuries.

The physical therapy clinic was responsible for seeing a monthly average of 31.6% of the total level II brigade medical care facility patient encounters including dental and mental health care visits (Fig. 3). Time for access to care for these
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Patients was favorable, with 91.3% of all initial visits for physical therapy seen within 48 hours, and 28.4% of those being on the same day as the consult was placed (Table I). A large number of visits (90.2%) did not result in the patient receiving a written notice excusing them from performing required activities for a certain period of time, and therefore it was assumed that they could return to their full duties. For those who did require a written excuse it was for an average of 17.5 (2–30) days (Table II). The majority of patient management was short term as 89.4% of SMs discontinued physical therapy and returned to some form of duty in less than 1 week, whereas only 6.9% were related to a battle injury. Approximately one in every five injuries was of a chronic nature, not related to any specific attributable cause, and primarily having to do with the spine, whereas 13.8% were classified as overuse injuries. Unit physical training was responsible for 12.4% of injuries and individual exercise, gym workouts, and recreation were the cause of 10.6% of injuries (Fig. 5). Of all these injuries, 9.1% were reported as existing before deployment, in contrast to 63.9% with symptoms of duration less than 1 month (31.8% less than 1 week).

A BCT is composed of soldiers with many different jobs and military occupation specialties (MOS). The majority of visits to physical therapy were from SMs in combat arms units (36.4%), followed by combat support units (32.2%), which included primarily soldiers from the brigade support battalion, as well as finance, judge advocate general’s (JAG) office, and the postal detachment. Military police (MP) soldiers made up 8.4% of the visits. A total of 18.9% of SMs that were seen, chose not to specify which units they belonged to for either operational or personal reasons (Table III). The MOS that had the highest correlation with seeking care for a low back pain complaint was 88M, which is a motor transport operator. Of all injured individuals, 38.1% reported using tobacco on a regular basis, which has been associated with impaired wound healing, increased wound infections, and degenerative tissue disorders.13–15

<table>
<thead>
<tr>
<th>TABLE I.</th>
<th>Time From Consult to Seeing the Physical Therapist</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consult Wait Times</td>
<td>Number</td>
</tr>
<tr>
<td>Same day</td>
<td>78</td>
</tr>
<tr>
<td>Next day</td>
<td>122</td>
</tr>
<tr>
<td>48 hours</td>
<td>51</td>
</tr>
<tr>
<td>72 hours</td>
<td>17</td>
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<tr>
<td>4 days</td>
<td>4</td>
</tr>
<tr>
<td>&gt;4 days</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>275</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TABLE II.</th>
<th>Days Seen Before Discharge From Physical Therapy—Return to Duty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Days to RTD</td>
<td>Number of Patients</td>
</tr>
<tr>
<td>Same day</td>
<td>150</td>
</tr>
<tr>
<td>&lt;1 weeks</td>
<td>95</td>
</tr>
<tr>
<td>&lt;2 weeks</td>
<td>5</td>
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<tr>
<td>&lt;1 month</td>
<td>10</td>
</tr>
<tr>
<td>&gt;1 month</td>
<td>14</td>
</tr>
<tr>
<td>Total</td>
<td>274</td>
</tr>
</tbody>
</table>

RTD, return to duty.

fractures and nonunion, high-risk stress fractures, tendon ruptures, etc.)

Of the 309 new encounters, demographic data were collected accurately for all variables in 224 of the patients. The most common body region of symptoms leading someone to seek care was the lumbar spine, followed by the shoulder, knee, and ankle (Fig. 4). The most common reported cause of injury was attributed to a specific incident at work (32.6%), whereas only 6.9% were related to a battle injury. Approximately one in every five injuries was of a chronic nature, not related to any specific attributable cause, and primarily having to do with the spine, whereas 13.8% were classified as overuse injuries. Unit physical training was responsible for 12.4% of injuries and individual exercise, gym workouts, and recreation were the cause of 10.6% of injuries (Fig. 5). Of all these injuries, 9.1% were reported as existing before deployment, in contrast to 63.9% with symptoms of duration less than 1 month (31.8% less than 1 week).

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In the environment of the FOB, the PT assumed a physician extender and orthopedic specialist role significantly increasing the capabilities of the assigned medical team. PT services were essential in improving SM access to care, providing specialized musculoskeletal management, assisting with acute orthopedic trauma management, and educating medical personnel on optimal musculoskeletal pathology management. Each is discussed here in turn.

**Service Member Access to Care**

The physical therapy clinic had a direct access policy allowing SMs with musculoskeletal complaints to seek physical therapy services without a consultation. However, in a combat setting where accountability and daily reports are an important part of the force health protection mission, physicians in level I facilities typically required that requests for physical therapy come through a consultation process. This would allow them to provide the appropriate daily status reports for medical accountability to the unit commanders. This also accounted for the small percentage of direct access visits during this time (2.2%), defined as visits to see the physical therapist without a referral. The majority of individuals in this category were from smaller units with no level I medical care. Additionally the other providers in the BCT clinic (i.e., medical doctor, physician assistant, nurse practitioner, etc.) stated they would like to see some of these conditions initially for education and experience for some of their providers with minimal experience. Despite the relatively low usage of direct access for our services, the physical therapy clinic consistently conducted the greatest number of patient care encounters, seeing almost one-third of all patients seeking level II medical care (Fig. 3).

Many SMs were on 6-day patrol schedules (patrol 12 hours each day for 6 days of the week) and they would only have late evenings or early mornings available to take care of medical concerns. To maximize access, there was an appointment procedure in place that allowed the SMs the flexibility of choosing a time that was most conducive to their schedule if they could not be seen at that specific time. This allowed for access that was compatible with the mission schedule of the SM. This process also allowed for over 90% of the SMs to be seen within 48 hours of receiving a consult from a primary care provider.

Traveling to see patients at outlying locations occurred every other week. The majority of the time travel was by helicopter. A portable treatment table was taken to every FOB within the brigade and left in the troop medical clinic for the duration of the deployment. A scheduling roster was left with the local provider, as well as contact information for the PT. If there were any special needs such as orthotics or braces, then the provider would request them for the PT’s next visit. A trip to provide care on another FOB would take anywhere from 1 to 3 days depending on the patient load that was present and on any transportation limitations.

**Orthopedic Trauma Management**

The PT managed the majority of orthopedic conditions to include all fractures occurring in the local area of operations. Before having a PT at that location, SMs with fractures were automatically evacuated to orthopedic care at the CSH (level III). The procedure for the management of fractures typically consisted of identifying the fracture with clinical exam and radiograph, placing the patient into temporary immobilization, saving an electronic copy of the radiograph, and sending
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Many who return to Iraq for full duty after they have been evacuated out of theater has been reported as low as 2%. In this practice environment, radiographic imaging for orthopedic injuries to include trauma was commonly evaluated by the PT. Management of fractures on the FOB by the PT prevented three to five evacuations to the CSH each month, representing a reduction of nearly 100% of the total previous NBI evacuations for bone fractures that required nonsurgical management.

**Trauma Management**

Because of the proximity to the CSH to the fighting and the ready availability of air evacuation assets (helicopters), most acute trauma management occurred at the CSH. In the majority of situations it was more efficient to evacuate casualties straight to the CSH and skip level II medical care completely. Providers at the level II medical facility on the FOB typically managed injuries resulting from nearby rocket or mortar fire or injuries to Iraqi nationals in close proximity to the FOB. The role of the PT during trauma management was to help with orthopedic injuries and included evaluating radiographs, resetting dislocated shoulders, and splinting compound fractures for air transportation to the CSH.

**Education**

Physical therapy also offered clinical classes to the other providers and medics in the troop medical clinic on orthopedic care and management, as well as injury prevention. Wearing body armor for multiple hours each day resulted in the occurrence of residual back pain in almost everyone, especially when performed every day with limited chance for rest. Education on core strengthening and stability as well as posture awareness was important to maximize the management of related back pain.

**DISCUSSION**

During the period of combat deployment with this particular unit, the presence of this physical therapy team may have resulted in a decrease in the amount of evacuations within and out of theater. The rate of patients with chronic low back pain who return to Iraq for full duty after they have been evacuated out of theater has been reported as low as 2%. Many of the requests for NBI evacuations out of theater from the CSH were for the purpose of attaining advanced diagnostic imaging. The majority of NBI orthopedic evacuations from the level II care facility where this PT was located were routed through the PT. Only nine SMs were evacuated during this time frame at a rate of approximately 2 per 1,000 soldiers, which represents only one-tenth of the normal rate of reported NBI evacuations out of theater from 2003 to 2006 (20.5 per 1,000), of which over 90% are of musculoskeletal nature (Defense Medical Surveillance System Database, DMSS). Evidence-based clinical management guidelines can be applied to many conditions, even in these austere settings. For example, a clinician evaluating an NBI complaint for low back pain (which is the number one cause for medical evacuations from OIF) can determine a reasonable treatment plan on the basis of the patient presentation and clinical examination. Multiple guidelines in the medical literature highly recommend 4 to 6 weeks of quality conservative management before ordering any diagnostic imaging. Diagnostic imaging can provide irrelevant findings and is not always a good prognostic tool when evaluating the cause of low back pain. In the absence of true red flags, most of these patients would likely receive similar conservative care after being evacuated out of theater. If the purpose for evacuation out of theater is for further diagnostic imaging, consideration of how the results will alter the planned intervention is important.

 Shoulder symptoms were common and responsible for the second highest main complaint for seeking care in the physical therapy clinic second only to low back pain. A potential reason for this was the increase in personal exercise time at the gym. With limited options for entertainment and use of personal time on a secluded FOB, there was increase in activity at the gym where many individuals chose to spend their personal time. Compared to anecdotal experience back in CONUS garrison setting, the proportion of shoulder injuries in theater seemed to be much higher. The reported cause of injury for the majority of these shoulder complaints was related to weight training at the gym. For PTs working at this level that are seeing a similar pattern, providing injury prevention classes to SMs and unit commanders regarding proper exercise and training techniques is recommended.

Vital to a successful physical therapy mission is communication with providers and leadership regarding the assets the physical team can bring to the force health protection mission. The majority of other medical providers and unit leadership were unaware of the physical therapy scope of practice. It was very important to educate commanders on the role the physical therapy team could play in injury prevention, as it has a direct impact on unit strength and maximizing of combat manpower. At the time of this deployment, many medical providers at the CSH were unaware that physical therapy was available to SMs back at the FOB and were electing to evacuate patients out of theater if they needed further conservative care. An attempt was made at consolidating a list of contact information for PTs located on the different FOBs within the region. This roster allowed providers at the CSH to coordinate conservative care management of patients throughout the theater.

Communication and collaboration with other health professionals at all levels of the medical health care system was essential to the success of our mission. It is recommended that physical therapists set to deploy with BCT elements ensure that they are familiar with the procurement process for medical
supplies which is enhanced by establishing a good working relationship and line of communication with the brigade medical supply officer (BMSO) as well as the brigade surgeon.

SUMMARY
During this deployment, the sustained presence of a PT in close proximity to troops on the front line appeared to improve the quality of medical care for soldiers in the brigade. Their presence demonstrated that forward-deployed management of musculoskeletal conditions can result in decreased access to care time frames for specialized orthopedic care, high return-to-duty rates, and potentially decreased evacuations within and out of theater, ultimately decreasing the workload at higher level medical facilities.

ACKNOWLEDGMENTS
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REFERENCES