Sports Medicine Training Room Clinic Model for the Military

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ABSTRACT A transition from traditional problem-based clinics to the Sports Medicine and Reconditioning Team (SMART) clinic model was completed by January 2009 at Marine Corps Base Camp Lejeune. The SMART clinic model allows for more patients to be seen and enhances coordinated care between providers. The objective of this research is to show the advantages of implementing a training room team approach for the care of musculoskeletal injuries in active duty members by comparing the number of patients seen, the number of limited duty (LIMDU) periods, the number of physical evaluation boards (PEBs), and the percentage of orthopedic referrals. Electronic medical records for patients seen at sports medicine clinics between January 1, 2007 and December 31, 2010 were reviewed. Naval Hospital Camp Lejeune provided a database of patients placed on LIMDU and PEB from 2007 through 2010. Fifty-eight and twenty-four percent more encounters occurred in 2009 and 2010, respectively, than that in 2007. The percentage of LIMDU referred for PEB in 2010 was reduced to 9% compared to that in 2007. In conclusion, the SMART clinic model allows for more patients to be seen and a reduction in the percentage of patients recommended for PEB from LIMDU.

INTRODUCTION
Musculoskeletal (MS) injuries are common in the military. The 1996 Armed Forces Epidemiological Board reported that MS conditions are the leading cause of disability in the U.S. Armed Forces and account for 63% of disability in the Navy and Marine Corps.1 A study of Army soldiers at Fort Lewis, Washington, showed an injury rate of 81 injuries per 100 soldiers per year with 55% associated with exercise and sports injuries.2 A study of Army recruits at Basic Combat Training school at Fort Jackson, South Carolina, showed that MS injuries were the greatest cause of entry-level discharges.3

Traditional problem-based clinic visits for MS injuries of active duty service members require providers who may not be specialized in MS injuries to evaluate the patient and refer to an appropriate consultant such as a physical therapist or orthopedic surgeon. Inherent delays between providers often result in a delay of care and suboptimal treatment for an injury. Additionally with active duty members, these delays may result in failures from training schools, missed deployments, and decreases in medical readiness for deployable units.

Before the implementation of the Sports Medicine and Reconditioning Team (SMART) clinic model, traditional 20-minute appointments were made with sports medicine fellowship-trained physicians at Marine Corps Base Camp Lejeune Mainside and Camp Geiger designated sports medicine clinics. The limited number of specialty trained physicians limited access of active duty members to the sports medicine clinics. After an initial appointment in the sports medicine clinic, another appointment at a future date would be required to be seen by a physical therapist or sports trainer.

A transition to SMART clinic models began in October 2008 and was completed by January 2009 at Marine Corps Base Camp Lejeune Mainside and Camp Geiger. The SMART clinic model is to decrease the number of orthopedic surgery consults required because of earlier diagnosis and intervention with a traditional clinic model system.

The primary disadvantage of the SMART clinic model is the decreased amount of patient privacy with the open-bay arrangement. However, multiple signs are present stating that private examination rooms are available at the patient’s request. Also, private examination rooms are available for physical examinations, mental health evaluations, and joint injections of female patients with a female chaperone present.
The objective of this research is to show the advantages of implementing a training room team approach for the care of MS injuries in active duty service members over the traditional clinic approach. Specific areas to compare are the number of patient encounters, the percentage of limited duty (LIMDU) periods that resulted in physical evaluation boards (PEBs), and the percentage of orthopedic surgery referrals of active duty members from the sports medicine clinics.

DESIGN METHODS

Electronic medical records were used and reviewed retrospectively for every active duty service member patient encounter at sports medicine clinics by fellowship-trained sports medicine family medicine physicians at Marine Corps Base Camp Lejeune Mainside and Camp Geiger between January 1, 2007 and December 31, 2010. An active duty service member seen at a sports medicine clinic had a new encounter generated for each visit, and a single patient could have multiple encounters. Outcome measures that were evaluated for the 2 years prior and 2 years after the implementation of the SMART clinic model were the numbers of encounters of active duty service members and the percentage of encounters that were referred for orthopedic surgery consultations.

The Naval Hospital Camp Lejeune Medical Records Department provided a database of patients placed on LIMDU boards and PEBs for each calendar year from 2007 through December 2010. From that database, 8,299 patients with MS injuries were identified and separated by the year they were first placed on LIMDU, and the percentages of MS LIMDU patients that resulted in a PEB were calculated. The results are shown in Table I and Figure 4.

RESULTS

Electronic medical records were reviewed for physician providers of the sports medicine clinics from January 2007 through December 2010, which included patients seen 2 years prior and 2 years after the implementation of the SMART clinic model. The number of patient encounters, orthopedic consults, and the percentage of orthopedic consults are shown in Figures 1, 2, and 3, respectively.

The transition to the training room model allowed for significant increases in the number of patient encounters at the Camp Lejeune and Camp Geiger sports medicine clinics. Fifty-eight and twenty-four percent more encounters occurred in 2009 and 2010, respectively, than that in 2007.

There was also a slight decrease in the percentage of patient encounters that were referred to the orthopedic surgery clinic for evaluation. There was a 9% relative reduction in orthopedic consults in 2009 and a 31% relative reduction in 2010 compared to 2007.
Additionally, the percentage of LIMDU boards that resulted in PEBs was decreased following the implementation of the training room model. The percentage of LIMDU referred for PEB in 2010 was reduced to 9% compared to that in 2007 with a relative reduction of 40%. Of note, MS extremity injuries accounted for 64% of all LIMDU between 2007 and 2010.

### TABLE I. Yearly Total Camp Lejeune LIMDU, MS LIMDU, and MS PEB

<table>
<thead>
<tr>
<th>Year</th>
<th>LIMDU</th>
<th>MS LIMDU</th>
<th>% MS LIMDU</th>
<th>MS PEB</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>2,877</td>
<td>1,865</td>
<td>65</td>
<td>436</td>
</tr>
<tr>
<td>2008</td>
<td>3,174</td>
<td>1,757</td>
<td>55</td>
<td>343</td>
</tr>
<tr>
<td>2009</td>
<td>3,632</td>
<td>2,700</td>
<td>74</td>
<td>504</td>
</tr>
<tr>
<td>2010</td>
<td>3,197</td>
<td>1,977</td>
<td>62</td>
<td>280</td>
</tr>
</tbody>
</table>

### CONCLUSIONS

The open-bay training room design of the SMART clinic model allows for more patient encounters than the traditional clinic model. The improved access to care and multidiscipline team approach provided by the SMART clinic model at Marine Corps Base Camp Lejeune resulted in a reduction in the percentage of patients recommended for PEBs from LIMDU boards.

### DISCUSSION

To our knowledge, this is the first study which demonstrates improved access to care and reduced attrition associated with the SMART clinic model. The Naval Health Research Center studied the effects of the open-bay sports medicine clinics utilized at Camp Lejeune between 2003 and 2004 on orthopedic consults. This SMART clinic study reported a 21 to...
43% reduction in the number of orthopedic surgery consultations. Interestingly, this study reported on a 2003 through 2004 open-bay, open-access Camp Lejeune SMART clinic system similar to the 2009 Camp Lejeune SMART clinic model. The Camp Lejeune sports medicine services changed to an appointment-based consult only clinic in 2005 for reasons unknown to the authors.

Unlike our results, the earlier SMART study showed significant reductions in the number of orthopedic consults. In our study, there were only minor decreases to the percentages of orthopedic referrals after the SMART clinic model was implemented. For both the traditional clinic model and the SMART clinic model, the referrals were made by fellowship-trained sports medicine family physicians. The small decrease in orthopedic surgery consults after the SMART clinic model was implemented in our study may be attributable to the earlier diagnosis and treatment for sports-related injuries.

Several other military bases utilize the SMART clinic model, although little published literature about their advantages is available. The open-bay training room design allows for more patients to be seen than the traditional clinic model. Additionally, SMART clinics allow for a coordinated multidisciplinary approach for the treatment of MS injuries and for direct transition of care and communication between physicians, athletic trainers, and physical therapists.

There are several obvious limitations to this study. It is a retrospective study based on reviews of electronic databases. The study covers only a 4-year period in which the transition to a SMART clinic model was made between the second and third years. Different sports-medicine-trained physicians were present during different parts of the study, which could account for some of the differences in the number of patients seen and the number of orthopedic referrals given for different years.

Future studies should evaluate the number of limited duties and the savings as a result of reduced number of lost man-hours after the implementation of the SMART clinics. The specific attrition rate for the Marine Corps School of Infantry at Camp Geiger over a several year period should be evaluated to assess the effects of the SMART clinic on a training command requiring a high level of physical activity. A multicenter study would reduce the errors associated with having only a few providers at a single clinic. Furthermore, the percentage of orthopedic consults that require surgery should be evaluated.

REFERENCES