

# **The Role of Physical Therapists in Wound Management**

## **An Update**

January 2017



Academy of Clinical Electrophysiology & Wound Management:

A Wound Management Special Interest Group White Paper



# **The Role of Physical Therapists in Wound Management**

## **An Update**

### **Purpose:**

The purpose of this report is to educate patients, physicians, nurses, allied health professionals, payors and coders, legislators, and the general community regarding the very important role physical therapists have in the area of wound management. While entry-level physical therapists receive a good foundation for practicing in the area of wound management, many therapists spend hundreds of hours in mentored on-the-job clinical training, self-study, and post-graduate professional continuing education in order to advance their wound management knowledge and skill. Many physical therapists achieve board certified specialization in the area of wound management as a mechanism of documenting their high level of training.

The Academy of Clinical Electrophysiology & Wound Management's (ACEWM) Wound Management Special Interest Group (WMSIG) is proud to produce this white paper in support of physical therapists across the nation practicing contemporary, evidence-based wound management.

Stephanie Woelfel, PT, DPT, CWS, FACCWS, Task Force Chair & Co-Author  
Karen A. Gibbs, PT, PhD, DPT, CWS, Co-Author

### **Task Force Members:**

Frank Aviles Jr. PT, CWS, WCC, FACCWS, CLT  
Melissa Johnson PT, DPT, CWS  
Hollie Mangrum PT, DPT, CWS  
Tim Paine PT, CWS  
Valerie Sullivan PT, MS, CWS  
Shelley Swen PT, DPT, CWS

## **The Role of Physical Therapists in Wound Management: An Update**

### **Introduction & Background**

Physical therapy as a discipline got its start during World War I when Reconstruction Aides trained by Mary McMillan cared for injured soldiers. Shortly after the war, the American Physical Therapy Association (APTA) was founded and the profession of physical therapy formalized.<sup>1</sup> Almost since its inception, practitioners in the field of physical therapy have been involved in wound management.<sup>2</sup> Today, with increasing healthcare costs and an aging population, healthcare providers must deliver efficient, high-quality care within an ever changing reimbursement environment.

The Academy of Clinical Electrophysiology and Wound Management's (ACEWM) Wound Management Special Interest Group's (WMSIG) vision for the future is that physical therapists will be recognized as vital members of the multidisciplinary wound management team. The WMSIG acknowledges the absolute need for and benefit of coordinated care delivered by multiple healthcare providers in the examination, evaluation, and intervention of patients at risk for and/or with open wounds. Multidisciplinary care is important due to the relationship between all body systems and the fact that insult to one impacts the others. Open wounds result from internal (e.g. vascular insufficiency), external (e.g. burn injury), or a combination (e.g. diabetic foot ulcer) of factors and can be complicated by various comorbidities (nutrition, drugs, disease, genetics). For these reasons, it is the WMSIG's position that optimal patient care is accomplished through coordinated, collaborative practice that incorporates the very best that each discipline has to offer. Our position is best represented by a quote from Dr. Carrie Sussman, long-time ACEWM member and pioneer in wound management physical therapist practice: *"Treat the whole patient, not just the hole in the patient."*

This WMSIG white paper describes the role of physical therapists in wound management through discussion of contemporary entry-level education, intervention, state-specific considerations, involvement across practice settings, and reimbursement issues.

### **Physical Therapist Education in Wound Management**

Entry-level physical therapist education includes training in areas such as gait, exercise, range of motion, stretching, and strengthening. Noninvasive screening, interpretation, and monitoring of body systems and differential diagnosis are other important areas of knowledge and skill included in entry-level physical therapist education. Additionally, a strong background in anatomy, pathophysiology, tissue healing, and biomechanics provides an underlying foundation from which the physical therapist can select appropriate tests and measures and interpret results to prescribe safe and specific intervention.<sup>3</sup> This knowledge and skill prepares clinicians for practice in commonly known areas of physical therapy such as orthopedics, neurologic rehabilitation, geriatrics, pediatrics, and sports therapy.

This same entry-level education uniquely prepares physical therapists to begin very early practice in a more specialized area of patient care – wound management. In fact, the physical

therapist’s in-depth knowledge and skill in movement science, body system screening, anatomy, and pathophysiology provide the perfect foundation for practitioner involvement in the early detection, direct wound management, and prevention of integumentary system compromise. Principles of range of motion, stretching and strengthening, gait training, positioning, and soft tissue mobilization common in all entry-level programs are vital interventions in a comprehensive plan of care focused on wound closure and return to function. Additionally, appropriate use of active biophysical agents unique to physical therapist training and education can be equally important. Modern technologies allow for easy and effective application of pulsed lavage, sound, electrical, and mechanical energies for wound cleansing, debridement, edema reduction and control, and tissue stimulation.

*Wound-Specific Topic Summaries.* The following table provides a summary of wound-specific topics included in APTA documents regarding integumentary content for physical therapist entry-level education: *Minimum Skills*,<sup>4</sup> *Normative Model*,<sup>5</sup> and the *Wound Management Guide*.<sup>6</sup> Additionally, some advanced knowledge and skill topics are shown to give an idea of content obtained at the post-graduate (continuing education, mentoring, and work experience) level for specialized practice in wound management. A complete list of advanced knowledge and skill expectations required for board certification in wound management can be found on the American Board of Wound Management (ABWM) website.<sup>7</sup> The combined information of both entry-level and post-professional knowledge and skill clearly demonstrates the many ways in which the physical therapist can contribute as a member of the wound care team.

#### Entry-Level and Post-Professional Knowledge & Skill Summary

<p><b>Normal Tissue Healing</b></p>	<ul style="list-style-type: none"> <li>• Anatomy &amp; function of the skin, physiology &amp; phases of tissue healing</li> <li>• Types of wound closure, general positive/negative factors affecting tissue healing</li> <li>• <b>Post-graduate:</b> In-depth knowledge of cell function. Recognition of wide range of complicating factors and methods to mitigate modifiable factors</li> </ul>
<p><b>Examination</b></p>	<ul style="list-style-type: none"> <li>• General health status, medical/social/family history</li> <li>• Family/work/community responsibilities</li> <li>• Education, ability for self-care</li> <li>• Primary complaint/symptoms, current intervention/plan, functional status, &amp; medications</li> <li>• <b>Post-graduate:</b> In-depth knowledge of how multiple factors may affect complicated patients; knowledge of imaging, nutrition, risk &amp; functional assessment, bioburden, laboratory, &amp; imaging</li> </ul>
<p><b>Systems Review</b></p>	<ul style="list-style-type: none"> <li>• Gross screening of body systems: Musculoskeletal, neuromuscular, cardiopulmonary, immune, &amp; integumentary</li> </ul>

	<ul style="list-style-type: none"> <li>• <b>Post-graduate:</b> In-depth knowledge of additional body systems including endocrine, lymphatic, &amp; urinary/excretory &amp; their role in overall health/ability for healing</li> </ul>
<b>Tests and Measures</b>	<ul style="list-style-type: none"> <li>• Wound characteristics including tissue identification &amp; quality, periwound characteristics, wound measurements (including Rule of Nines &amp; Lund and Browder) &amp; characteristics of wound drainage</li> <li>• Signs of infection (local vs systemic), types of infection, awareness of tests to determine infection (serology, radiographic, biopsy, etc.), &amp; infection prevention measures</li> <li>• Noninvasive vascular screening including palpation of pulses/skin temperature, skin/nail characteristics, &amp; ankle brachial testing</li> <li>• Pain, sensory integrity, pressure risk, anthropometric measurements (i.e. edema/girth), mobility, &amp; function</li> <li>• <b>Post-graduate:</b> Full integration of test &amp; measure results &amp; indications for complicated patients. In-depth knowledge of tissue oxygenation &amp; determination of wound severity</li> </ul>
<b>Wound Etiology and Differential Diagnosis</b>	<ul style="list-style-type: none"> <li>• Differentiation &amp; assessment of various local/systemic etiologies/injury that increases the risk of or has resulted in integumentary compromise</li> <li>• Entry-level etiologies include: Pressure, vascular compromise, neuropathic, traumatic, burns, surgical, &amp; basic dermatological issues.</li> <li>• <b>Post-graduate:</b> In-depth knowledge of additional etiologies including Systemic Lupus Erythematosus, sickle cell, arthritic &amp; vasculitic, infection, complex pressure ulcers, pyoderma gangrenosum, calciphylaxis, malignancy, etc.</li> </ul>
<b>Psychosocial</b>	<ul style="list-style-type: none"> <li>• Effect of integumentary compromise on community/family/social/work life, emotional status, &amp; ability for participation in self-care</li> </ul>
<b>Intervention</b>	<ul style="list-style-type: none"> <li>• Pressure redistribution, offloading, positioning</li> <li>• Prescription/management of assistive devices, splints, &amp; orthotics</li> <li>• Wound cleansing/irrigation</li> <li>• Knowledge regarding non-surgical, debridement (mechanical, autolytic, enzymatic, sharp, chemical, &amp; biosurgical)</li> <li>• Qualities of advanced dressings &amp; use of common topical agents</li> <li>• Suture/staple removal</li> <li>• Basic scar management</li> </ul>

	<ul style="list-style-type: none"> <li>• Utilization of active biophysical agents including compression, electrical stimulation, pulsed lavage, ultrasound, &amp; negative pressure</li> <li>• <b>Post-graduate:</b> Knowledge and skill in performing sharp/non-surgical debridement, ultrasonic debridement, &amp; various methods of wound cleansing, irrigation, &amp; tissue stimulation. Advanced skill with various compression methods/technologies &amp; offloading. Management of bioengineered tissue &amp; advanced topical therapeutic agents. Monitoring pharmacologic indications &amp; side effects</li> </ul>
--	--

## Interventions for Patients with Wounds

Based on wound etiology, there are several exercise interventions that can be used to enhance healing and improve functional outcome. Below are examples of physical therapist intervention for cases of pressure, diabetes, and vascular insufficiency.

*Pressure.* In the case of pressure injuries, physical therapists can provide positioning interventions and surface recommendations to optimize off-loading of affected tissues. For pressure injuries that involve full-thickness tissue loss, physical therapists can additionally assess for functional deficits created by the tissue destruction and develop an exercise prescription to address these areas. This may include, but is not limited to, therapeutic exercise to improve range of motion and strength, therapeutic activities to address ability to transfer and minimize shear and friction forces, gait and balance assessment, assistive device training including wheelchair mobility, and pain management via manual techniques or biophysical agents. Pain also is addressed through the selection of appropriate dressings that promote a moist wound healing environment, reduce the frequency of dressing changes, and can potentially reduce the need for referral to the physician for adjustments in pain medications. Referrals may be requested for dietary support to ensure appropriate nutrition for tissue healing. Patient/family/caregiver education regarding positioning, transfers, exercise, and direct wound care is another important role of the physical therapist as many family members are actively involved in taking care of their loved one's needs.

*Diabetes.* As obesity continues to rise, so does the incidence of diabetes and diabetic foot ulcers (DFUs). The American Diabetes Association recommends moderate-to-vigorous aerobic exercise at least five days per week for 30 minutes at a time or 150 minutes weekly. Strength training twice weekly also is recommended. This can help to reduce blood glucose levels and improve insulin sensitivity<sup>8</sup>. However, the benefits of exercise must be balanced with protecting DFUs from pressure and shear during weight bearing activities. Fortunately, thorough assessment of foot biomechanics, gait, and footwear allows the physical therapist to develop individualized exercise programs that minimize these forces and allow patients with DFUs to engage in safe physical exercise. Physical therapists also frequently partner with physicians when patients require shoe inserts and/or advanced offloading techniques (e.g. Charcot foot). As part of the general examination and evaluation of patients with diabetes,

physical therapists perform noninvasive vascular and sensory screens, general skin and nail assessment, obtain a history of glucose control, and assess patient understanding of diabetes. This assists the therapist in determining whether additional referrals (e.g. advanced vascular screening, podiatry, diabetic education) should be discussed with the primary care physician. Patient education regarding ulcer prevention (e.g. daily inspection and foot care, appropriate shoes/socks, importance of regular glucose monitoring/good control) is another important role of the physical therapist when working with this population. Physical therapists also provide direct ulcer management offering sharp debridement of nonviable tissue, advanced dressings to control bioburden, removal of periwound callous, and patient education regarding ulcer care at home. Once closure is achieved, physical therapists assist patients in safely returning to activity following wound closure by titrating appropriate activity to reduce the risk of wound recurrence<sup>9</sup>. Early intervention, patient education, and appropriate wound management can reduce the risk of amputation and improve quality of life. In patients with amputation, physical therapists work collaboratively with physicians and orthotists to achieve the patient's highest level of safety and independence with mobility.

*Vascular Insufficiency.* Physical therapists have an important role in recognizing relevant patient history and signs and symptoms of vascular insufficiency. Based on this information, physical therapists can perform various noninvasive vascular screens (ankle-brachial index, rubor of dependency, capillary refill, palpation, visual inspection, etc.) and examination of wound characteristics (if a wound is present) to differentiate venous, arterial, or mixed vascular compromise. Differential diagnosis is utilized to determine the appropriate intervention; accuracy of the diagnosis is crucial since the intervention for one can be strictly contraindicated in the other. Referral to the primary care physician for advanced vascular screening, possible surgical repair, dietary care, or counseling services also may be warranted. It is important to note that early identification, intervention, and referral by the physical therapist may prevent integumentary compromise and improve quality of life. Specifically with arterial insufficiency, early identification and referral has the potential to prevent amputation and loss of life.

Venous - Patients with venous insufficiency can decrease symptoms by improving ankle range of motion and return of venous flow. Supervised calf muscle exercise can significantly improve venous hemodynamics in patients with lower extremity venous insufficiency ulcers caused by vein valve incompetence and impaired calf muscle pump function.<sup>10,11</sup> Depending on the overall intervention plan, physical therapists can select and apply appropriate methods of compression, provide direct management for open wounds, and prescribe individualized exercise programs. It has been shown that patients who receive supervised lower extremity exercise programs and counseling regarding compression adherence are more active and may achieve faster wound closure.<sup>10,12</sup> Patients with lower extremity venous insufficiency who are not candidates for surgical intervention likely will require life-long compression. The physical therapist is uniquely trained to provide education regarding venous etiology and can assist patients in matching the best level and method of compression with their home- and work-life needs.

Arterial – Many patients with arterial insufficiency can achieve improved blood flow to affected areas through surgical intervention with stenting, bypass grafts, etc. However, not all patients qualify for these procedures due to overall poor health status, lifestyle choices (smoking), etc. While patients with severe arterial compromise (critical limb ischemia) should not engage in exercise programs unless they have undergone surgical intervention, many patients with lower levels of arterial compromise can benefit from individualized, progressive, monitored exercise. Parmenter et al. found patients with a lower resting ankle-brachial index (0.28 to 0.82) demonstrated global deficits including decreased whole body strength, shorter distance to first stop during the 6-minute walk test, decreased single leg balance, and decreased bilateral hip extensor strength (as evidenced by decreased 6-minute walk distance and reduced score on the short physical performance battery).<sup>13</sup> Through individualized examination and evaluation of a patient with arterial compromise, a physical therapist can determine the appropriate mode and intensity of exercise to maximize function, improve muscle oxygen efficiency, and improve overall health. Progressive (graded) exercise also promotes the formation of new blood vessels and collateral circulation. Spronk et al. compared a walking program to surgical revascularization and found both groups demonstrated similar outcomes at six and 12 months but the exercise group showed a clinically significant improvement in maximum pain free walking distance and overall walking distance.<sup>14</sup> Interestingly, there was no difference in ankle-brachial index improvements between these two groups.<sup>14</sup> This shows that appropriately dosed exercise may give poor surgical candidates an opportunity for improved quality of life. Physical therapists also have a role in the direct management of open wounds associated with arterial insufficiency. Utilizing results from vascular screens and consultation with physicians, physical therapists can determine appropriate wound management interventions (e.g. moist versus dry dressings, debridement versus no debridement, etc.). In cases of dry gangrene, physical therapists provide wound protection/offloading and education regarding the process of autoamputation, home care, and signs and symptoms and the emergent nature of conversion to wet gangrene.

### **State-Specific Considerations for Physical Therapists and Wound Management**

Each state has a practice act that clearly defines physical therapy practice in that state. At the time of this report, each state's practice act was reviewed and commonalities were identified. The following paragraphs provide a brief summary and highlight information specific to physical therapist involvement in wound management.

Physical therapy was defined similarly across all 50 states with common themes of 'treatment based on the evaluative findings' and 'designed to reduce or alleviate disability or disease, or improve health and bodily function.' Specific examples from three states are given below:

Alabama - The treatment of a human being by the use of exercise, massage, heat, cold, water, radiant energy, electricity or sound for the purpose of correcting or alleviating any physical or mental condition or preventing the development of any physical or mental disability, or the performance of neuromuscular-skeletal tests and measurements to determine the existence and extent of body malfunction.



Delaware - Alleviating impairments of body structure or function, activity limitations or participation restrictions in physical movement and mobility by designing, implementing, and modifying treatment interventions.

New York - The evaluation, treatment or prevention of disability, injury, disease, or other condition of health using physical, chemical, and mechanical means including, but not limited to heat, cold, light, air, water, sound, electricity, massage, mobilization, and therapeutic exercise with or without assistive devices, and the performance and interpretation of tests and measurements to assess pathophysiological, pathomechanical, and developmental deficits of human systems to determine treatment, and assist in diagnosis and prognosis.

Review of the practice acts revealed that none of the 50 states specifically indicated that wound management was disallowed. Nine state acts stated that “integumentary protection and repair” interventions were within the physical therapist’s scope of practice and seven indicated that “wound care” was within the physical therapist’s scope of practice. In states that were “silent” or did not mention specific wound management interventions, physical therapists were allowed to perform wound/integumentary interventions as described in the APTA’s *Guide to Physical Therapist Practice*.<sup>15</sup> No state prohibited physical therapists from performing debridement; in fact 20 state practice acts specifically indicated that debridement was within the physical therapist’s scope of practice.

As state practice acts are frequently updated, it is each physical therapist’s responsibility to regularly review documents for states in which they practice. All state practice acts are accessible through the APTA’s website ([www.apta.org](http://www.apta.org)).

### **Involvement of Physical Therapists Across Practice Settings**

Physical therapists treat patients across multiple practice settings including acute/intensive care, outpatient, rehabilitation, home health, skilled nursing, and sports performance. Since wound management needs vary among different patient populations and clinical settings, it is the physical therapist’s role to adjust examination techniques, evaluation, interventions, and goals as necessary to meet the individual needs of patients in each setting. While there are extensive areas of overlap, examples of how examination and intervention techniques might be utilized in different clinical settings are given below. It is important to note that it is the state practice act that guides physical therapist practice and not the clinical setting.

*Acute Care.* In acute care settings, physical therapists routinely provide treatment to patients with complicated burns, traumatic injuries, and post-surgical wounds. Additionally, many patients with acute illness and injury are susceptible to further insult from pressure and skin organ failure. Since payment in the acute care setting is based on diagnosis-related groups (DRGs), it is important for patient care to be efficient and collaborative in nature. In this setting, physical therapists contribute to the wound management team by provision of risk assessment, functional mobility training, direct management of open wounds, positioning,

pressure redistribution products, exercise, and the application of biophysical agents for pain reduction and tissue healing.

*Outpatient.* In outpatient settings, patients are typically more medically stable but can present with complex open wounds. In this setting, physical therapists might utilize wound management techniques such as debridement, compression, total contact casting, and the application of biophysical technologies including negative pressure, pulsed lavage, and electrical stimulation. Incorporation of therapeutic exercise into the wound management plan is also important as is maximizing functional movement. While the focus on function is not specific to outpatient, improving mobility and independence frequently is a primary goal in this setting as many patients wish to return to work, family, and social obligations.

*Skilled Nursing.* Patients in the skilled nursing setting often are seen as frail. This population typically is not medically stable, has little independent mobility, and may have extensive wound care needs complicated by multiple comorbidities that significantly reduce healing potential. For these reasons, the team approach to wound management is important especially in skilled nursing. In this setting, the physical therapist's role focuses not only on physical rehabilitation and pressure risk assessment/intervention, but also may have a strong emphasis on examination and evaluation of the entire patient. Screening and monitoring techniques are important since specialty physicians typically are available only on a monthly basis (or not at all) in this setting placing a stronger responsibility on physical therapists to track changes in patient status. The physical therapist also may be the primary provider of sharp debridement for patients with open wounds.

### **Reimbursement Considerations for Physical Therapists in Wound Management**

The ever-changing reimbursement climate continues to challenge physical therapists in the areas of billing and payment. Keeping abreast of current rules and guidelines is daunting, however, physical therapists must secure payment for services. Successful management of billing and payment necessitates physical therapists develop clear methods of acquiring timely information regarding reimbursement requirements and updates.

Below are strategies to help establish a sound framework for continued compliance within the realm of wound management. Three areas of focus for reimbursement success are: coverage, coding, and payment.

- From a coverage perspective - Are the procedures being performed covered by the current payment system and are the procedures being performed within the physical therapist's scope of practice?
- From a coding perspective - Are the ICD-10 and CPT codes being used medically necessary?
- In regards to payment - Are the treatments performed being reimbursed?

The ability to answer these questions may require collaboration with medical coders and billing specialists within the physical therapist's facility and frequent communication between these parties is vital.

Additionally, it is recommended that on an annual basis, physical therapists should

- Ensure access to current CPT and ICD-10 books
- Review the state practice act for changes that may affect practice
- Verify the local Medicare Administrative Contractor (MAC)

Throughout the year, it is recommended that the physical therapist

- Read and monitor all local coverage determinations (LCDs) and national coverage determinations (NCD's) affecting the MAC jurisdiction throughout the year
- Verify patient insurance and payer information to ensure proper prior authorizations are obtained when required for specific procedures related to wound management (e.g. negative pressure wound therapy, debridement, etc.)

Simply having a CPT code available for a specific intervention does not guarantee that it will be reimbursed. The table below contains CPT codes that currently (as of writing this report) pertain to wound management, but not all of these codes may be reimbursed in all settings or geographic areas.

<b>CPT Code</b>	<b>Brief Description</b>
29445	Lower extremity application of casts
29581	Multilayer compression wraps below knee
29582	Multilayer compression wraps below knee/thigh
29583	Multilayer compression wrap hand
29584	Multilayer compression wrap hand/forearm
97014	Unattended electrical stimulation
97597	Active wound management, first 20 sq cm
97598	Active wound management, each additional 20 sq cm
97602	Non-selective debridement
97605	Negative pressure wound therapy (NPWT) < 50 sq cm
97606	NPWT > 50 sq cm
97607	NPWT utilizing disposable DME < 50 sq cm
97608	NPWT utilizing disposable DME > 50 sq cm
97610	Low frequency non-contact ultrasound
G0239	Electromagnetic therapy; pressure, diabetic, venous and arterial ulcers
G0281	Unattended electrical stimulation; pressure, diabetic, venous and arterial ulcers
G0282	Unattended electrical stimulation; other wounds not listed above

Specific information pertaining to reimbursement of CPT codes and required supportive documentation can be found in specific MAC LCDs and NCDs at (<http://www.cms.gov/medicare-coverage-database/overview-and-quick-search.aspx>). Physical therapists should have access to local and national coverage determinations pertaining to all procedures performed in their specific clinical setting. These documents should be viewed as a “playbook” for reimbursement. In addition to providing documentation guidelines, these documents provide CPT and ICD-10 codes that support medical necessity along with descriptions.

Another helpful resource regarding CPT codes that can be billed together is the National Correct Coding Initiative Edits (NCCI). This document will help determine which services can and cannot be billed together (<http://www.cms.gov/Outreach-and-Education/Medicare-Learning-Network-MLN/MLNProducts/downloads/How-To-Use-NCCI-Tools.pdf>).

*Functional limitation reporting* has been integrated into outpatient physical therapy services for several years and therefore also is a requirement for physical therapists providing outpatient wound management services. CMS has directed physical therapists to select the “Other PT” G-code set when interventions are specifically directed to wound healing. Therapists must select the appropriate severity modifier for the patient based on the level of impairment due to the wound. The CH modifier (0% impairment) should be used only in a situation where physical therapy services are not intended to treat a functional limitation. This does not pertain to most instances of physical therapist involvement in wound management, therefore the therapist will use functional and wound healing outcome measures to determine the most applicable severity modifier for the patient.<sup>16</sup>

The “30 second chair stand” and “five times sit to stand” are recommended as functional outcome measures. The Bates Jensen Wound Assessment Tool (BWAT) and the Pressure Ulcer Scale for Healing (PUSH) tool are recommended highly for wound healing. Additional outcome measures that have been reviewed and recommended are available on the WMSIG page of the ACEWM website (<http://acewm.org/wound-management/wifl-recommendations/>).

### **Closing Comments**

The ACEWM WMSIG recognizes the physical therapist’s unique role in wound management and respectfully submits this white paper in strong support for inclusion of the physical therapist on multidisciplinary wound care teams. Physical therapists are invited to provide additional information and constructive feedback to [sandyrossi@apta.org](mailto:sandyrossi@apta.org).

## References

- <sup>1</sup>Murphy W. Healing the Generations: A History of Physical Therapy and the American Physical Therapy Association. American Physical Therapy Association, Alexandria, VA; 1995.
- <sup>2</sup>Broussard PC, Pickett EA. Role of therapy in wound management. In: Sheffield P, Fife CE eds. Wound Care Practice. 2nd Ed. North Palm Beach, FL: Best Publishing Company; 2007.
- <sup>3</sup>Standards and required elements for accreditation of physical therapist education programs. Commission on Accreditation in Physical Therapy Education. <http://www.capteonline.org/AccreditationHandbook/>. Accessed December 2, 2016.
- <sup>4</sup>Minimum Required Skills of Physical Therapist Graduates at Entry-Level. American Physical Therapy Association. [http://www.apta.org/uploadedFiles/APTAorg/About\\_Us/Policies/Education/MinimumRequiredSkillsPTGrads.pdf#search=%22minimum skills%22](http://www.apta.org/uploadedFiles/APTAorg/About_Us/Policies/Education/MinimumRequiredSkillsPTGrads.pdf#search=%22minimum%20skills%22). Accessed December 2, 2016.
- <sup>5</sup>American Physical Therapy Association. A Normative Model of Physical Therapy: Version 2007. Alexandria, VA: APTA; 2007.
- <sup>6</sup>APTA's academy on clinical electrophysiology and wound management guide for integumentary/wound management content in professional physical therapist education. American Physical Therapy Association. <http://www.aptasce-wm.org>. Accessed December 2, 2016.
- <sup>7</sup>CWS Content Outline. American Board of Wound Management. <http://www.abwmcertified.org/abwm-certified/cws/cws-how-to-prepare>. Accessed December 2, 2016.
- <sup>8</sup>What We Recommend. <http://www.diabetes.org/food-and-fitness/fitness/types-of-activity/what-we-recommend.html>. Accessed April 15, 2016.
- <sup>9</sup>Wendland D. Neuropathic wounds: Treatment beyond closure. *J Acute Care Phys Ther*. 2015;6(1):2-7.
- <sup>10</sup>Kan YM, Delis KT. Hemodynamic effects of supervised calf muscle exercise in patients with venous leg ulceration: A prospective controlled study. *Arch Surg*. 2001;136(12):1364-1369.
- <sup>11</sup>Padberg FT, Johnston MV, Sisto SA. (2004). Structured exercise improves calf muscle pump function in chronic venous insufficiency: A randomized trial. *J Vasc Surg*. 2004;39(1):79-87.
- <sup>12</sup>Heinen M, Borm G, van der Vleuten C, Evers A, Oostendorp R, van Achterberg T. The lively legs self-management programme increased physical activity and reduced wound days in leg ulcer patients: Results from a randomized controlled trial. *Int J Nurs Stud*. 2012;49:151-161.

<sup>13</sup>Parmenter BJ, Raymond J, Dinnen PJ, Lusby RJ, Fiatorone Singh MA. Preliminary evidence that low ankle-brachial index is associated with reduced bilateral hip extensor strength and functional mobility in peripheral arterial disease. *J Vasc Surg.* 2013;57(4):963-973.

<sup>14</sup>Spronk S, et al. Intermittent claudication: clinical effectiveness of endovascular revascularization versus supervised hospital-based exercise training--randomized controlled trial. *Radiology.* 2009;250(2):586-595.

<sup>15</sup>Guide to Physical Therapist Practice. [www.apta.org](http://www.apta.org). Accessed April 15, 2016.

<sup>16</sup>Hettrick H, Woelfel-Dyess S, Hamm R. Appropriate reporting of G-codes & C-modifiers by therapists who treat chronic wounds. *Today's Wound Clinic.* 2014;8(9).