



New Professional Careers in Oncology Rehabilitation: Bone Marrow Transplant Physical Therapist

My name is Shai Sewell, PT, DPT, CLT, who attended the University of Miami for my physical therapy education. My interest in physical therapy began in the ICU at the University of California, San Francisco Medical Center where I was lucky enough to get some hands on experience as an aide. My interest shifted to Oncology Rehab while I was in PT school. I was fortunate enough to receive an internship at the University of Florida Shands Medical Center in their outpatient lymphedema clinic and began my career at the University of Miami, Sylvester Comprehensive Cancer Center Inpatient Bone Marrow Transplant Unit. I then returned to the University of Florida where I continue to work in the Bone Marrow Transplant unit, and have gained experience in the management of postoperative oncology rehab in the acute setting. I am currently a member of the APTA Academy of Oncologic Physical Therapy, where I serve as the Chair of Social Media, and consider myself lucky to be a part of our new Student and New Professional Subcommittee.

In the following post I have compiled key concepts about bone marrow transplants, and the PT's role in this setting. I am extremely excited to share more about my experiences in this rewarding career with you!

Twitter Handle: @s_sewell_PT
Email: ssewell1989@gmail.com

Bone marrow transplants (BMT), often called Hematopoietic Stem Cell Transplants (HSCT) in the adult populations have been an evolving therapy used for the management of many blood borne cancers, such as leukemias and lymphomas, for decades. Some of these cancers include Hodgkin's Lymphoma, Acute or Chronic Myeloid Leukemia, Acute or Chronic Lymphoblastic Leukemia, Multiple Myeloma, and many others. The treatments for these cancers are individualized based on progression of disease, cytogenetics, and many other factors. There are two types of BMT: Autologous transplants and allogeneic transplants.

Although the BMT process can vary given the diagnosis, cytogenetics, and progression, there is a linear progression to the transplant itself:

- 1) **INDUCTION:** Induction chemotherapy is the initial treatment given, which is meant to put the disease into remission. During this process a patient may also receive radiation therapy in order to suppress tumor burden.
- 2) **CONDITIONING:** Once the patient achieves remission, there is another round of chemotherapy called conditioning, which is meant to suppress the immune system enough (also known as myeloablative) in order for the body not to reject the upcoming stem cell



transplant. This prepares the patient's marrow to receive the previously harvested stem cells and begin producing new, non-cancerous stem cells.

- 3) **TRANSPLANT:** The transplant itself is done the day after the conditioning process is completed. Within a couple weeks, doctors look for engraftment, where the proliferation of stem cells in the marrow begin to produce white blood cells, red blood cells and platelets.
- 4) **CONSOLIDATION:** Following transplant and achieving remission, consolidation therapy is often given in order to maintain remission. With consolidation chemotherapy, the goal is to remove any remaining cancerous cells.

There are many moments where we as rehab professionals can intervene to prevent, and address many activity restrictions. While pharmacological management is a common method prescribed by the medical team, polypharmacy can be a long-standing issue as survival rates continue to improve amongst this patient population. Some of the unique differences to hematological malignancies and their treatments, include the dose and rate at which chemotherapy is given, and the length of the inpatient hospital stays (although some clinics are performing outpatient transplants). Symptoms such as acute or chronic graft versus host disease, steroid induced myopathies, spinal and long bone metastasis, and becoming transfusion dependent due to pancytopenia, are seen more often than not in this population. While there are some unique side effects, there are other functional deficits that can occur during, or after treatment: Decreased cardiovascular endurance, which is directly affected by the prolonged nature of being sedentary while in the hospital, as well as the effects on the myocardium by chemotoxic agents leading to arrhythmias, or often acute, and sometimes a chronic decrease in left ventricular function. Decreased mobility due to fatigue, myalgias and arthralgias, can cause deconditioning as well as pain. Chemotherapy induced peripheral neuropathy can be found in >50% of BMT patients, and can cause constant pain or discomfort, as well as balance deficits.

These are only some, but often common side effects in which we can, and should intervene. We may use measures such as the 6-minute walk test, the BERG balance test, the timed up and go, or 5x sit to stand throughout the continuum of care, beginning with a pre-transplant assessment. Proximal muscle strengthening and stability exercises for steroid induced myopathies, intrinsic foot exercises for chemotherapy induced peripheral neuropathies, high intensity interval training for strength and cardiovascular function, and a world of other exercises can be performed to improve functional outcomes.

With the realization that baseline function may now have potential to influence transplant tolerance, and post-transplant quality of life, some oncologists are now requiring baseline measurements to assess the possible need to address functional limitations, primarily in strength and cardiovascular endurance. As the world of Oncology Rehabilitation begins to grow exponentially within the APTA, ACRM, ACSM and other alike, there is so much room for us as Physical Therapists to influence the outcomes of these patients, and to PREVENT and REDUCE unnecessary long-term sequelae from these treatments!



APTA Oncology[™]
An Academy of the American
Physical Therapy Association

Student and New
Professional
Subcommittee

If you are nervous, or unsure of what to do with these patients as you begin your career, please remember that you know more than you can ever imagine. Use your differential diagnosis skills, and outcome measures to assess these patients functional deficits, and individualize *every* treatment, *every* day, for *every* patient.

If you have further questions or would like to discuss specific treatment approaches in this setting, please feel free to reach out to me via any of the contact information above. I'm not shy :p

Some wonderful articles to spark your curiosity and send you through the infamous Google Scholar wormhole!

- Fu JB, Tennison JM, Rutzen-Lopez IM, et al. Bleeding frequency and characteristics among hematologic malignancy inpatient rehabilitation patients with severe thrombocytopenia. *Support Care Cancer*. 2018;26(9):3135-3141.
- Steinberg A, Asher A, Bailey C, Fu JB. The role of physical rehabilitation in stem cell transplantation patients. *Support Care Cancer*. 2015;23(8):2447-2460.
- Wiskemann J, Huber G. Physical exercise as adjuvant therapy for patients undergoing hematopoietic stem cell transplantation. *Bone Marrow Transplant*. 2008;41(4):321-329.