**Inservice Presentation/ Case Study**

**Pt background info:**

* 57 YOM presenting w/ significant R quad resection due to malignant vascular neoplasm (pseudomyogenic hemangioendothelioma) of bone/ soft tissue
	+ Prevalence: one in one million; 4.6:1 M:F in 20-50’s; over 50% affects LE
* Surgical date: 10/28/2019; discontinued original PT due to high levels of pain

**Initial eval Findings 10/16/2020:**

* R knee AROM: 45, PROM: 50 both w/ significant pain
* R LE mm dysfunction in: hip flexion 2-/5, knee flexion and extension
* Significant hypomobility of R patella and significant scarring
* Highly antalgic gait on R LE

**Re-assessment Findings 12/1/2020:**

* R knee AROM: 65, PROM: 65 degrees w/ continued pain (both numbers down from earlier measurements before UPOC ~75 degrees)
* R LE mm scoring: hip flexion 2+/5, R knee flexion 3-/5, knee extension 2+/5
* Improved patellar mobility in medial/ lateral and superior/ inferior directions w/ continue pain
* Improved scar mobility w/ moderate adhesions on lateral aspect of patella
* Continued impaired gait mechanics
* Inability to transfer sit<> stand without kicking R LE out to decrease bending required; L LE hooking for transferring Supine<> sit

**\*further regressed in most recent session; has canceled 2 visits in a row due to pain w/ PT**

**What Has Worked:**

* Aggressive scar massage
* Patellar mobilizations in extended knee and w/ towel propping
* Kinesiotaping in star pattern for continued scar mobility
* MLD
* CKC ROM activities (counter squats) w/ significant cueing
* upright bike?
* Gait training over low hurdles for hip/knee flexion in swing phase
* Gravity minimized hip flexion activities

**What has not worked:**

* focus on quad/hip strengthening in favor of knee ROM
* wall slides
* prone quad stretch
* self-guided ROM & STM/ scar massaging

**What could potentially work moving forward:**

* low level laser/ cold laser therapy?
* Continued ckc ROM
* Gait/transfer activities for increase functional independence
* light intensity leg press?

**Bibliography:**

1. Bensadoun RJ. Photobiomodulation or low-level laser therapy in the management of cancer therapy-induced mucositis, dermatitis and lymphedema. *Curr Opin Oncol*. 2018;30(4):226-232. doi:10.1097/CCO.0000000000000452

**Findings:** LLLT beneficial for improvements in reduction of local inflammatory processes/ lymphedema in cervical/ neck/ oral cancers. More research needed for other regions of body.

1. Hamblin MR, Nelson ST, Strahan JR. Photobiomodulation and Cancer: What Is the Truth?. *Photomed Laser Surg*. 2018;36(5):241-245. doi:10.1089/pho.2017.4401

**Findings:** LLLT/ PBM may cause biphasic dose–response curve to “overdose” the cancer cells. Known as high fluence low-power laser irradiation, HF-LPLI, has been shown to regress tumor growth/ size in animal studies (further research needed.) Most reasonable explanation for this effect: In cancer cells, where adenosine triphosphate (ATP) supply is quite limited, the ATP boost given by PBM may allow the cancer cells to respond to pro-apoptotic cytotoxic stimuli with more efficiently executed cell death (apoptosis) programs, which are heavily energy dependent. In contrast, in normal healthy cells that have an adequate supply of ATP, the effect of PBM produces a burst of reactive oxygen species (ROS) that could induce protective mechanisms and reduce the damaging effects of cancer therapy on healthy tissue. Possible role of PBM in stimulation of the immune system to fight against the cancer (in particular, T lymphocytes and dendritic cells secreting type I interferons).

1. Dima R, Tieppo Francio V, Towery C, Davani S. Review of Literature on Low-level Laser Therapy Benefits for Nonpharmacological Pain Control in Chronic Pain and Osteoarthritis. *Altern Ther Health Med*. 2018;24(5):8-10.

**Findings:** In cold laser therapy, coherent light of wavelength 600 to 1000 nm is applied to an area of concern with hope for photo-stimulating the tissues in a way that promotes and accelerates healing. LLLT, using the properties of coherent light, has been seen to produce pain relief and fibroblastic regeneration in clinical trials and laboratory experiments. LLLT has also been seen to significantly reduce pain in the acute setting; it is proposed that LLLT is able to reduce pain by lowering the level of biochemical markers and oxidative stress, and the formation of edema and hemorrhage. Many studies have demonstrated analgesic and anti-inflammatory effects provided by PBM in both experimental and clinical trials.

1. Epithelioid Hemangioendothelioma. National Cancer Institute. https://www.cancer.gov/pediatric-adult-rare-tumor/rare-tumors/rare-vascular-tumors/epithelioid-hemangioendothelioma. Accessed December 16, 2020.