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## Case Report: Effects of Therapeutic Exercise on a Patient with Metastatic Osteosarcoma and Pathological Fracture

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# Case Report: Effects of therapeutic exercise on a patient with metastatic osteosarcoma and pathological fracture

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## BACKGROUND

- ◆ Breast cancer is one the most common malignancies in females which can lead to metastasis into other body regions including bone.<sup>1</sup>
- ◆ Metastatic pathological fractures of the spine are usually the initial manifestation in many cases.<sup>2</sup>
- ◆ Spinal metastasis is usually asymptomatic and therefore, difficult to detect during early stages, leading to detection and diagnosis occurring after a pathological fracture has manifested leading to decreased function in patients.<sup>2-4</sup>
- ◆ Current literature reflects evidence supporting rehabilitation interventions in low-level functioning patients but there is limited support regarding higher-level functioning patients.<sup>3,4</sup>

## PURPOSE

To demonstrate how rehabilitative interventions for patients with active metastatic neoplasms can improve quality of life (QoL) after a pathological fracture of the lumbar vertebrae.

## CASE DESCRIPTION

### Patient Profile

- ◆ 44-year old female, diagnosed with breast cancer in Sept 2019. After experiencing a pathological fracture of L1 in Nov 2019, she was diagnosed with bone cancer.
- ◆ She has active tumors in T4, T6-7, and L1, with L2 nerve root compression, L4-5 disc herniation, L5-S1 broad based disc protrusion.

### Previous & Concurrent Treatment

- ◆ Radiation therapy and home health physical therapy completed prior to episode of care (EoC) in outpatient.
- ◆ Taking Zometa for bone health and attended regular medical appointments with oncologist during EoC.

### Body Structure/Function Impairments

- ◆ Decreased endurance, LE strength, and core strength
- ◆ Decreased muscle length
- ◆ Impaired sensation

### Activity Limitations

- ◆ Walks for only 15 minutes at a time

### Participation Restrictions

- ◆ Requires thoracolumbosacral orthosis (TLSO) brace in unfamiliar community locations
- ◆ Cannot participate in her normal exercise regimen

## PLAN OF CARE

### Physical Therapy sessions:

- ◆ 1-hour sessions 2x/week for 3 weeks (6 visits total)

### Interventions<sup>6</sup>

- ◆ **Therapeutic Exercise**
  - *LE Strengthening* - Open & closed chain table exercises progressed to standing hip strengthening
- ◆ **Neuromuscular Re-education**
  - *Core Stability & Endurance* - rhythmic stabilization techniques and spinal stabilization exercises
  - *Neural Tension* - sciatic nerve glides
  - *Balance* - proprioceptive training with tandem stance, single leg, eyes open & closed
- ◆ **Therapeutic Activity**
  - Sit to stand
  - *Patient education* - activity pacing to minimize fatigue

## OUTCOMES

Outcome Measure	Initial Evaluation	Progress Note
Dermatomes	L1-S2 hyposensitivity	L1-L2 hyposensitivity
Slump Test	Positive bilateral	Negative bilateral
Upper Abdominal Trunk Strength	3/5	5/5
Hamstring flexibility	L = (15°) knee ext R = (20°)	L = 0° R = 0°
5-time Sit to Stand	NT	20.2 s
Single Limb Balance	NT	L = 7 s, R = 12 s
Modified Oswestry Disability Index	46% = severe disability	38% = moderate disability

NT = not tested

- ◆ After 6 visits, the patient showed decreased neural tension, improvements in strength and functional capacity.
- ◆ She was unable to perform 5xSTS and SLB due to fear and hesitation with movements required by the test upon evaluation. At the progress note, she was able to perform both tests cautiously.
- ◆ She was very receptive to therapy sessions that focused on education and progression of exercises to challenge the patient safely. There was high compliance to HEP due to this, and she was encouraged to walk everyday in 10-15-minute bouts; this led to positive outcomes with QoL.<sup>8</sup>

## DISCUSSION

- ◆ Patient-specific interventions and patient education focused on spinal stability, core endurance, LE strengthening, neural tension, and therapeutic activity improve functional outcomes for a patient with metastatic cancer and lumbar pathological fracture.<sup>8-10</sup>
- ◆ Further studies could develop more appropriate quantitative outcome measures and improved validity for higher-functioning patients with cancer.
- ◆ Psychosocial factors including previous activity level and internal motivation could also be appropriate qualitative studies to predict QoL in patients with cancer.<sup>8-11</sup>

## CLINICAL RELEVANCE

- ◆ Physical therapists are trained to screen out non-musculoskeletal pain, including cancer.<sup>1</sup> Less commonly, therapists in the outpatient orthopedic setting see patients to rehabilitate low back pain due to active cancer.
- ◆ With contraindications to tumor removal, these patients can improve QoL through both medical intervention and physical therapy.<sup>5</sup> It is important to know the effectiveness of such interventions while following all contraindications and precautions for this population, especially with an unpredictable course of the disease.<sup>6</sup>
- ◆ Patients, like this case, with active metastatic cancer and pathological fracture will have contraindications to joint mobilizations, mechanical traction, and modalities such as heat, ultrasound, electrical stimulation.<sup>7</sup> Therapists involved with rehabilitation will need to provide salient and functional treatment without such interventions.<sup>6-7</sup>

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