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Chordoma Foundation 2021 Virtual Chordoma Community Conference (CCC) Series-Improving balance, strength, and mobility after treatment

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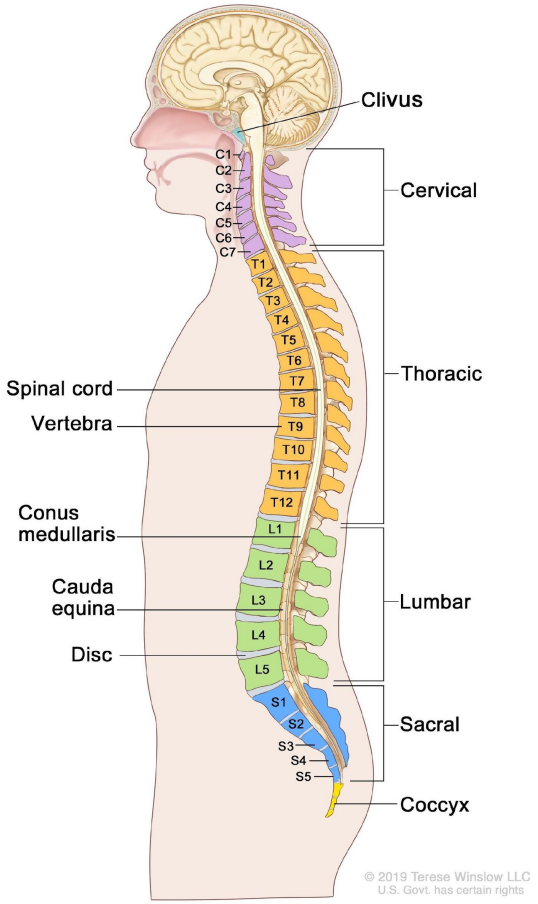
Disclosures

No financial relationships exist

How do Chordomas impact balance, strength and mobility?

- Chordomas occur in the bones of the skull base and spine
  - Clivus (skull base)
  - Cervical spine (neck)
  - Thoracic spine (chest)
  - Lumbar spine (low back/abdomen)
  - Sacral spine (pelvis/low back)



Kim DC, U.; Kim, S.; Bilsky, M. . Tumors of the Spine First Edition. Philadephia, PA: Elsevier Health Sciences; 2008.
https://www.cancer.gov/publications/dictionaries/cancer-terms/def/spinal-column
https://www.chordomafoundation.org/

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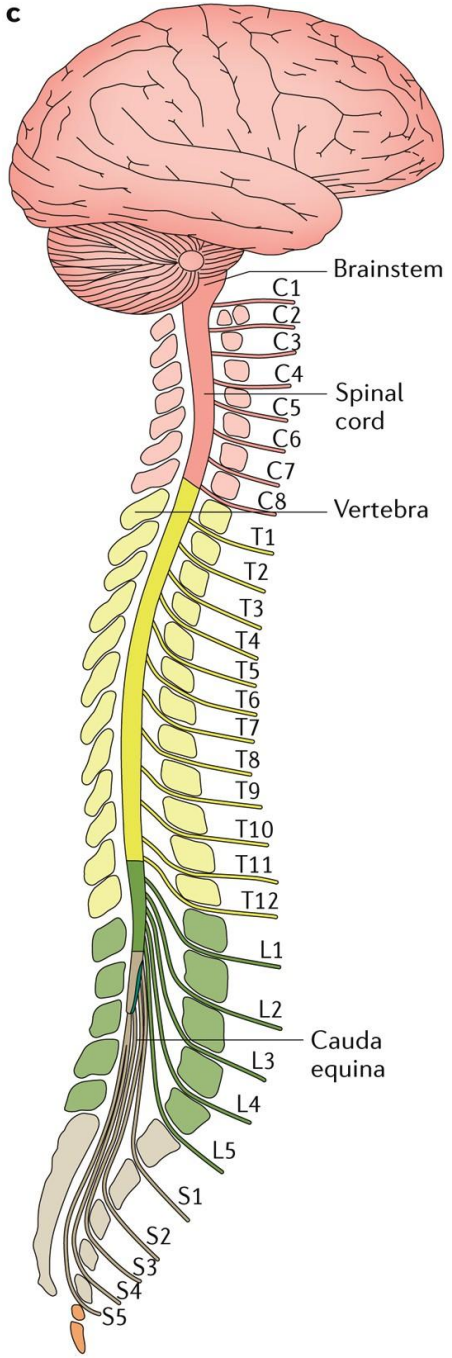

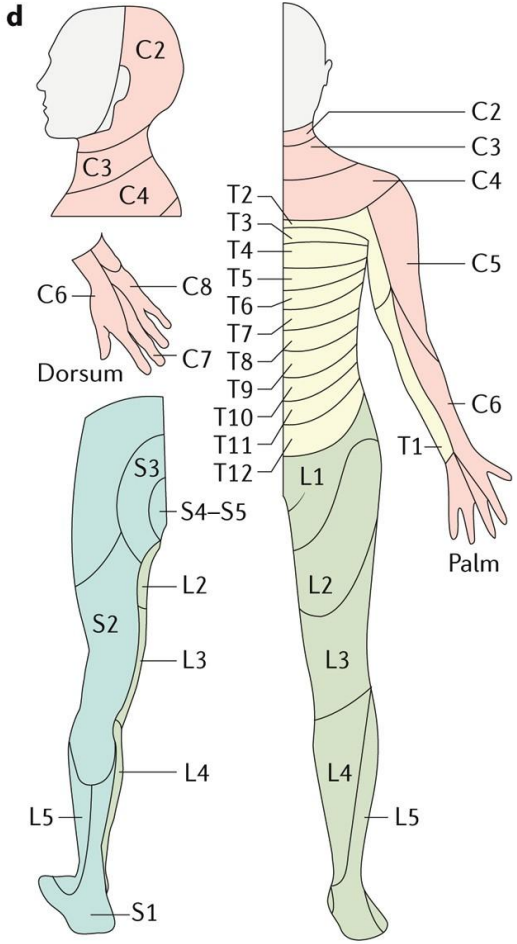

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C5 C6 C7 C8	Elbow flexors Wrist extensors Elbow extensors Finger flexors
T1	Finger abductors
L2 L3 L4 L5	Hip flexors Knee extensors Ankle dorsiflexors Long toe extensors
S1	Ankle plantar flexors

How do neurologic impairments impact mobility?

- **Vision impairments**
  - Loss of vision, double vision, balance impairments, nausea
  - Impacts: bed mobility, transfers, walking, ability to utilize adaptive equipment, ability to operate a wheelchair
- **Weakness**
  - Impaired upper and lower extremity movement
  - Impacts: bed mobility, transfers, walking, ability to utilize adaptive equipment, ability to operate a wheelchair
- **Sensory**
  - Loss of awareness of environment, positioning of joints, balance
  - Impacts: pain, bed mobility, transfers, walking, ability to utilize adaptive equipment, seating in wheelchair

How does bone involvement impact mobility?

- **Musculoskeletal abnormalities**
  - Scoliosis, kyphosis, pelvic obliquity, surgical resections
  - Abnormal postures, movement, weightbearing status
  - Impacts: pain, bed mobility, transfers, walking, ability to utilize adaptive equipment, seating in wheelchair, ability to operate a wheelchair

Evaluating mobility impairments requires a multidisciplinary team

- Patient
- Neuro-oncologists
- Medical and radiation oncologists
- Spine surgeons
- Physiatrists
- Pain and palliative care specialists
- Ophthalmologist (neuro)
- Physical therapists
- Occupational therapists
- Certified Prosthetist Orthotist (CPO)
- Assistive Technology Professional (ATP)/Certified Rehabilitation Technology Supplier (CRTS)

Evaluating functional impairments and mobility

- Present Illness
- Past Medical History
- Medications
- Social history
- Prior/current functional status
- Support system

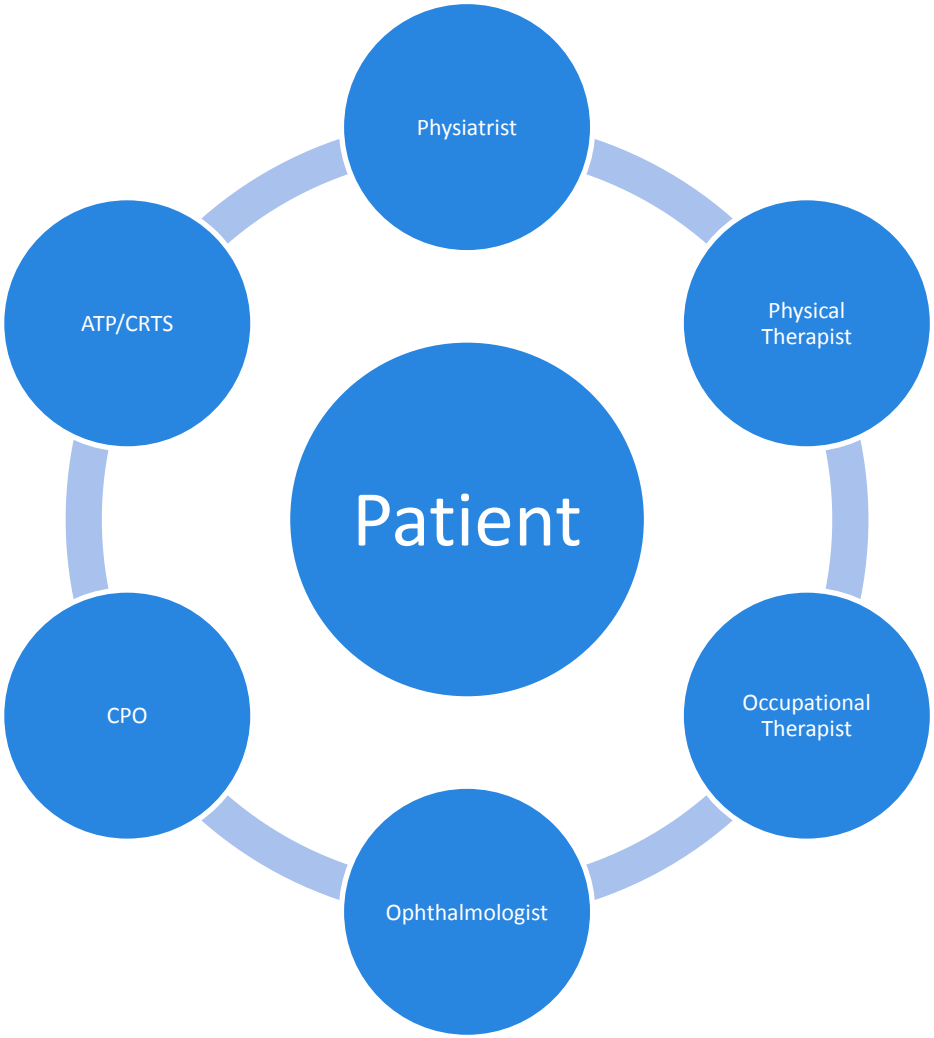
- Examination
  - Key & non-key muscles in upper/lower extremities
  - Sensation to light touch/pin prick/proprioception
  - Cognition
  - Blood pressure/fluid status
  - Skin integrity
  - Evaluation for skeletal anatomic abnormalities
  - Evaluate gait biomechanics/kinematics if able

Ruppert LM, Reilly J. Metastatic spine oncology: symptom-directed management. *Neurooncol Pract* 2020;7:i54-i61

Goal of clinical evaluation is to understand impairments, their impact on function, and to establish a management plan

- NLI/Patterns of injury
- Pain
- Musculoskeletal contributions
- Precautions-medical/bone /spine
- Anticipated treatment/clinical course
- Patient goals

Establishing a Rehabilitation Plan for Mobility



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Rehabilitation Plan-Medical Management

- Pain
  - Medication management (oral/topical/ intrathecal)
  - Interventional procedures

https://wongbakerfaces.org/

Rehabilitation Plan-Therapy

- Physical Therapy
  - Strength training, endurance training, standing and balance training, sensory reintegration, transfers, gait training, wheelchair mobility (if needed), pain management, stretching, range of motion, exercise program, equipment assessment
- Occupational Therapy
  - Strength training, balance training, fine motor skills, range of motion, positioning, ADLS, pain management, exercise program, equipment assessment

Ruppert LM, Reilly J. Metastatic spine oncology: symptom-directed management. *Neurooncol Pract* 2020;7:i54-i61

Rehabilitation Plan-Therapy

- Vision therapy (neuro optometric rehab)
  - Comprehensive vision evaluation
  - Glasses/prisms/eye patch
  - Exercises to improve visual perception/processing
  - May accompany vestibular rehabilitation

SUNY Optometry-https://sunyopt.edu

Rehabilitation Interventions-Adaptive Equipment

- Bracing
- Assistive devices
- Wheelchairs
- Other durable medical equipment

Rehabilitation Plan-Collaborating with CPO on Bracing

- Spine bracing
  - Indications-pain, instability, abnormal spine alignment
- Extremity bracing
  - Indications-weakness, joint contractures, management of musculoskeletal abnormalities

Spinal braces are named based on regions of the spine they encompass

Thoraco-**L**umbar **O**rthosis (TLO)

Thoraco-**L**umbo-**S**acral **O**rthosis (TLSO)

Cervical **O**rthosis (CO)

Lumbo-**S**acral **O**rthosis (LSO)

Ruppert L, Yakaboski M. Rehabilitation-Bracing as a Conservative Treatment Option. Essentials of Interventional Cancer Pain Management. Springer Nature.

Extremity braces are named based on joints they encompass

Ankle **F**oot **O**rthosis (AFO)

Hip Knee Ankle **F**oot **O**rthosis (HKAFO)

https://www.gillettechildrens.org/your-visit/patient-education/hip-knee-ankle-foot-orthosis-hkafo-reciprocating-gait-orthosis-rgo

Knee **A**nkle **F**oot **O**rthosis (KAFO)

https://www.bostonoandp.com/products/lower-limb-orthotics/kafos/

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Assistive devices are recommended based on individual need and upper extremity function

- Assistive devices may include
  - Cane (single point, quad)
  - Walker (standard, rolling)
  - Crutches (axillary, forearm)

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Wheelchairs

- Collaboration with ATP/CRTS
- In-depth evaluation is key
  - Wheelchair should be customized to patient
  - Proper wheelchair dimensions
  - Determine appropriate chair type (power vs manual)
  - Assess for certain modifications
    - ie: cushion type, anti-tippers, truncal support, head and neck support, drive controls

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https://www.nsm-seating.com/mobility

Additional durable medical equipment to meet mobility needs –lifts, standers, transfer benches

https://www.assistedliving.org/best-hoyer-lifts/

https://www.rehabmart.com/product/easystand-original-evolv-sit-to-stand-standing-frame-itemized-48592.html

https://www.walmart.com/ip/BeasyTrans-Easy-Transfer-System-BeasyGlyder

https://dmesupplyusa.com/drive-medical-folding-universal-sliding-transfer-bench.

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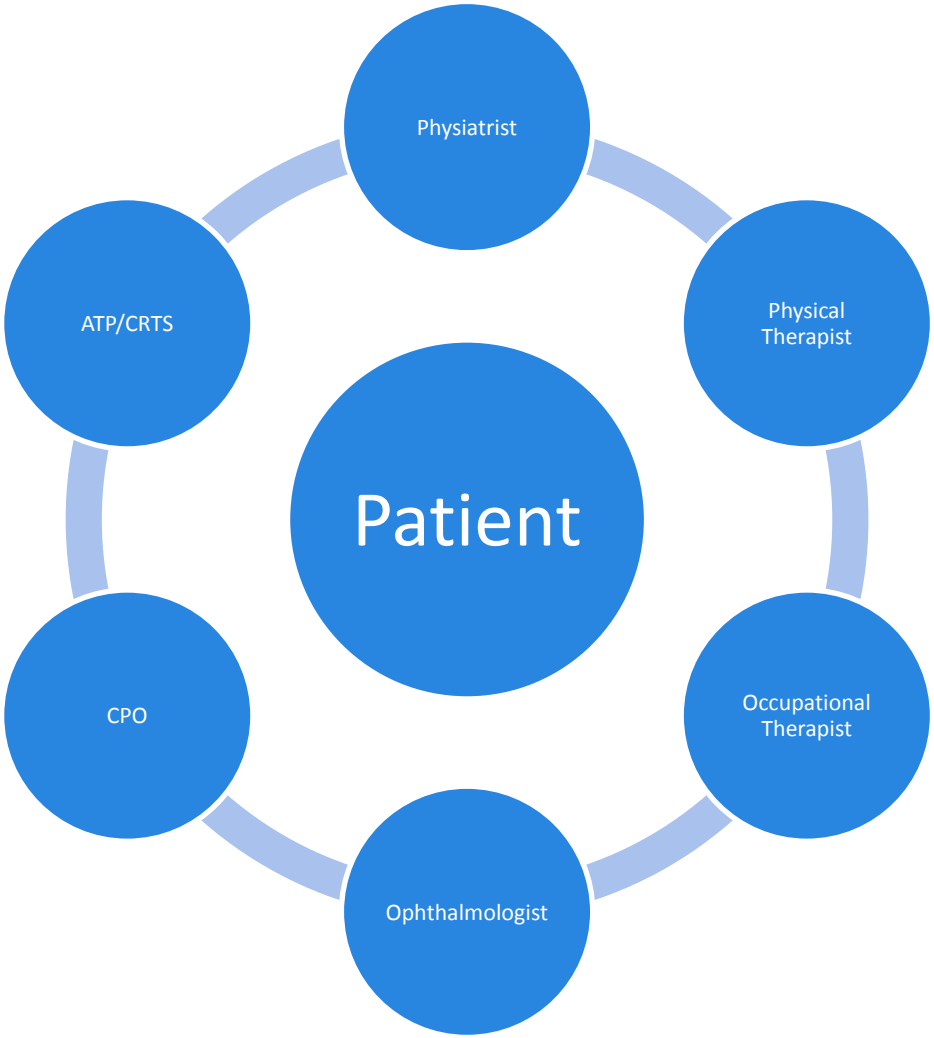
Improving balance, strength, and mobility



Resources

-Paralyzed Veterans of America Consumer Guides: https://pva.org/research-resources/publications/consumer-guides/

-American Spinal Injury Association Guidelines for Use of Durable Medical Equipment for Persons with Spinal Cord Injury and Dysfunction. https://asia-spinalinjury.org/product/guidelines-for-use-of-durable-medical-equipment-for-persons-with-spinal-cord-injury-and-dysfunction/

-Spinal cord injury communities

https://www.spinalcord.com/life-after-a-spinal-cord-injury

https://facingdisability.com/

https://axisproject.org/programs

-Finding a physical therapist

https://aptaapps.apta.org/APTAPTDirectory/FindAPTDirectory.aspx

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