

Movement System Impairment Syndromes of the Cervical Spine

Shirley Sahrmann, PT, PhD, FAPTA
 Prof Emerita Physical Therapy
 Washington University School of
 Medicine – St. Louis

Human Movement System

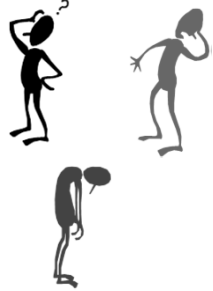
- Physical Therapy Identity
- Diagnosis made by PTs are of the movement system
- Movement System Impairment (MSI) Syndromes
 - Subset of Movement System Diagnoses

MSI Syndromes

- Named for the alignment and/or movement direction that most consistently causes pain and is impaired
- When the impaired movement is corrected the symptoms decrease or are eliminated

Movement System Impairment Diagnoses of Cervical Spine

- Extension
- **Rotation***
- Flexion
- Rotation-extension
- Rotation-flexion
- * most common component



Manual Skills

- Hands on for
- Assessing the cervical rotation
 - Where the motion is occurring
 - The resistance of shoulders and shoulder musculature
- Correction of cervical muscle effects and the effect on mobility
- Treatment:
 - Guide patient in correct motion
 - Alleviating symptoms with correction of cervical alignment,
 - Cervical motion
 - Shoulder girdle muscular effects
- Manual assistance for correction in several positions

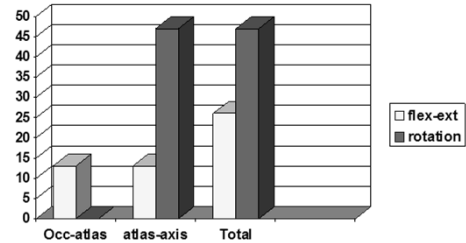
Contributing Factors

- The musculature of the shoulder girdle affects
 - alignment, movement, stress on the cervical spine
 - alignment of the shoulder girdle is a key to cervical pain
- The alignment of the thorax affects the alignment of the cervical spine
 - Both kyphosis and flat
- Alteration of intrinsic cervical muscle performance
 - usually related to head position in relation to gravity
- Compensations between upper and lower cervical spine motion

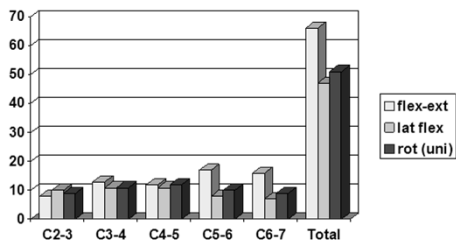
Common Impairments

- Intrinsic neck muscles become weak or long - compromise fine control of vertebral motion
- Extrinsic muscles become dominant adding to compressive, rotational, & shear forces exerted on the cervical spine

Upper Cervical Range of Motion



Lower Cervical Range of Motion



Head and Neck Extensors

- Intrinsic muscles
- semispinalis capitis
- semispinalis cervicis
- **pure sagittal rotation**

DeRosa & Porterfield

Head & Neck Rotators/extensors

- Intrinsic muscles
- semispinalis cervicis
- superior oblique
- inferior oblique
- rectus capitis cervicis


Attached to C2

DeRosa & Porterfield

Attachment of Cervicospinal Muscles Extension with Translation

- Trapezius - Levator Scapulae


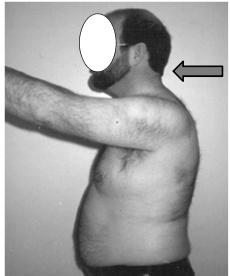
DeRosa & Porterfield



Signs and Contributing Factors: Altered upper and lower cervical participation; over developed extensors, inadequate deep neck flexors


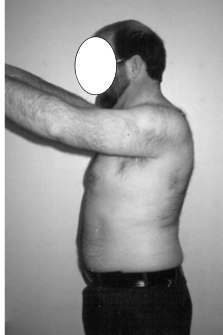
CERVICAL EXTENSION SYNDROME


Movements of the Upper Extremities
 Cervical motion induced by shoulder motion

Cervical extension with shoulder flexion.

Shoulder Flexion while contracting deep neck flexors
 Decreases cervical extension and pain







Signs and Contributing Factors: Asymmetrical upper and lower cervical rotation; Imprecise rotation; Altered action of Cervico-scapular muscles

CERVICAL ROTATION SYNDROME

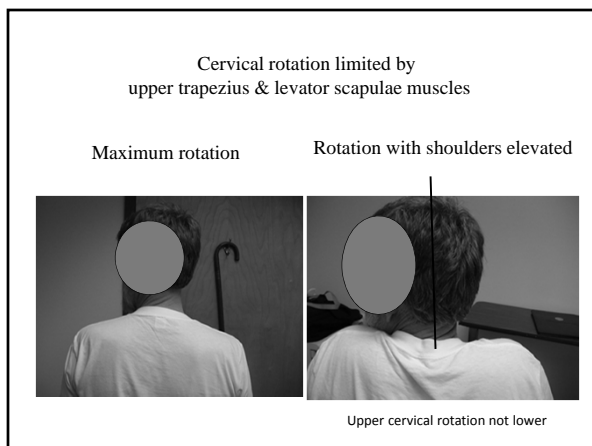
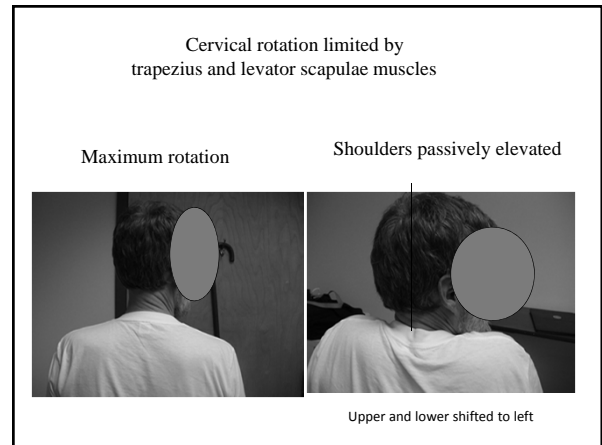
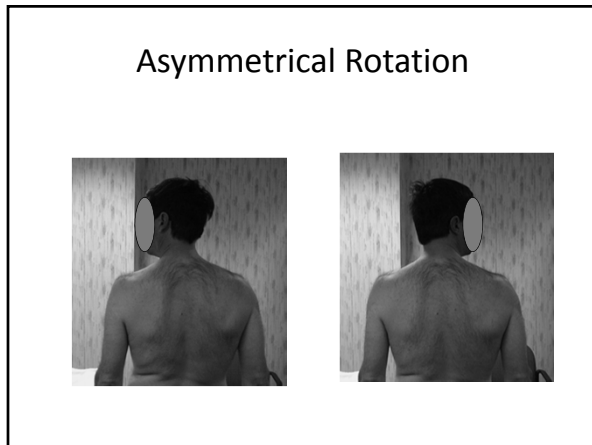
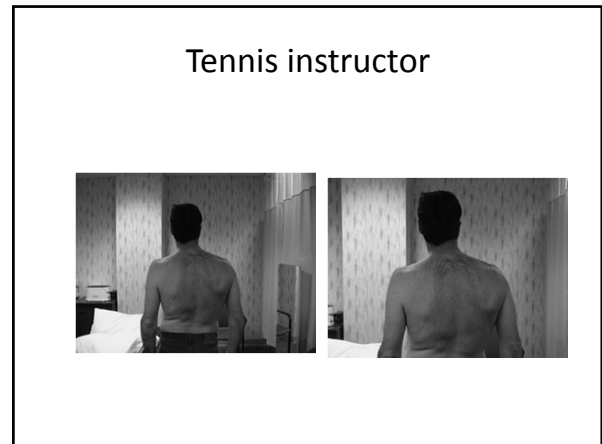
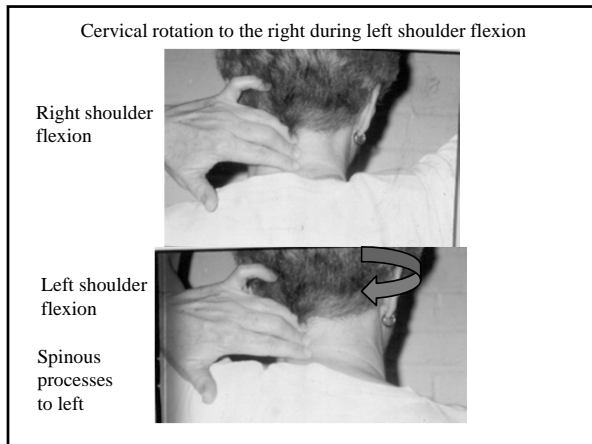
Upward rotation of scapula stretches levator scapulae muscle
 cervical vertebrae will rotate to same side if hypermobile




Kendall 1993

Upper trapezius rotates head & neck to opposite side


Kendall 1993



Impaired Flexion



Forward head with increase upper thoracic flexion



Flexion – lower spine remains extended

Neck Flexors

- Intrinsic muscles
- Longus capitis
- Longus colli

- **Pure sagittal rotation**

DeRosa & Porterfield

Dominant Extrinsic Neck Flexors

- **Sternocleidomastoid**
 - Sternal & clavicular head > Mastoid
 - significant influence on cervical spine motion but does not directly
 - attach to C spine
- **Function:**
 - bilateral - flexion
 - unilateral - rotate to one
 - side & laterally flex to
 - opposite side

Mechanical Neck Pain - Porterfield & DeRosa

Sternocleidomastoid Multiple Actions

<p>Rotation</p> <p>Flexion lower C-spine</p>	<p>Extend upper C-spine</p> <p>Forward translation with anterior shear</p> <p>Particularly with weak intrinsics</p>
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Mechanical Neck Pain - Porterfield & DeRosa

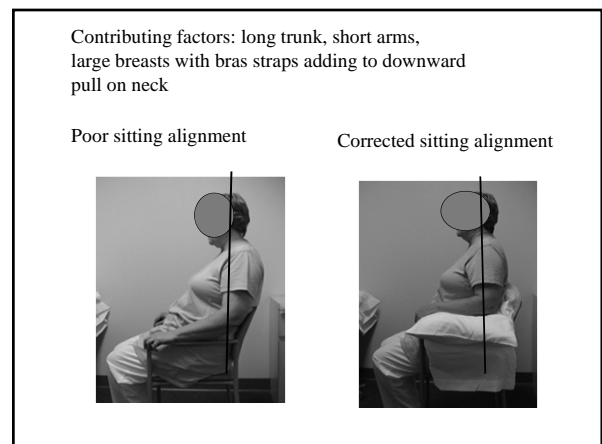
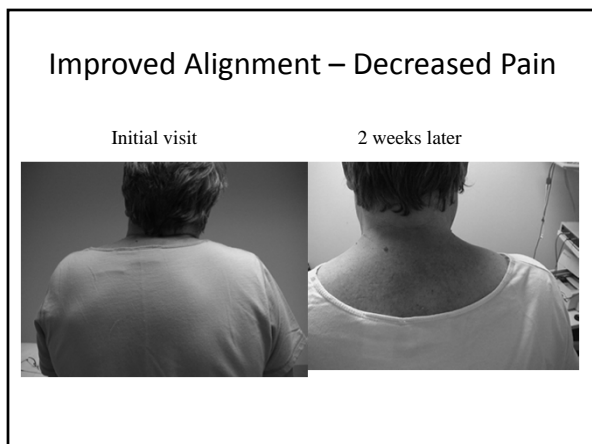
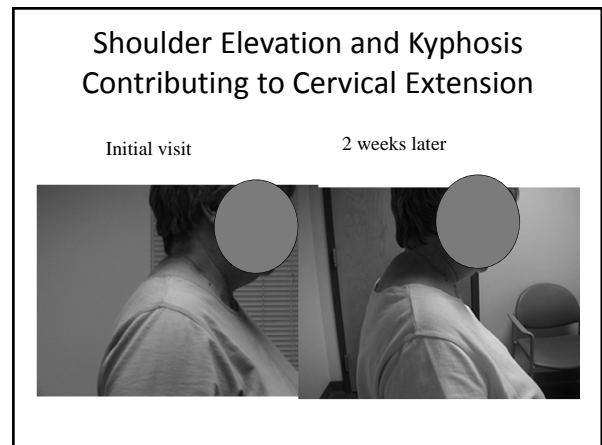
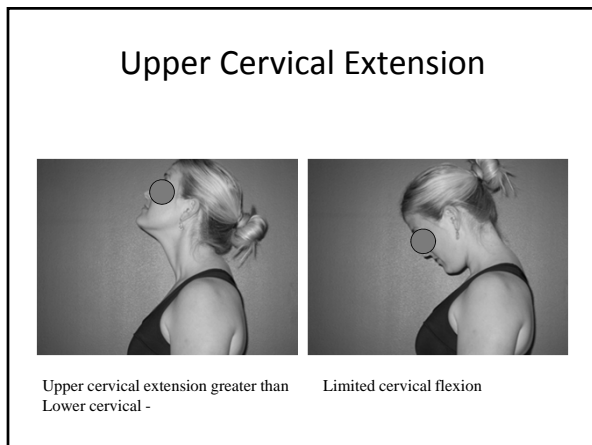
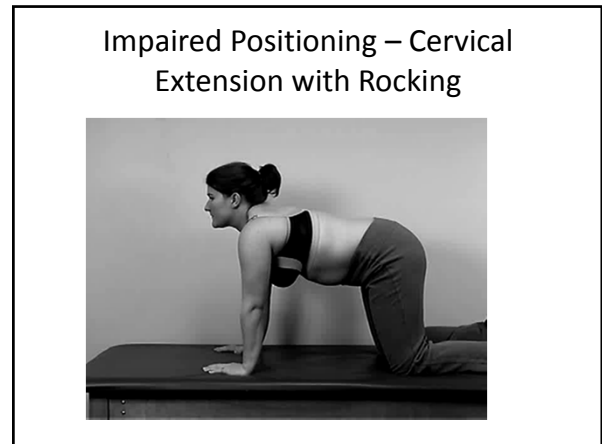
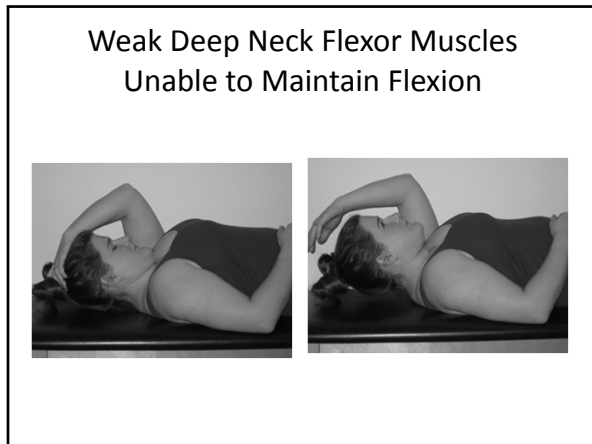
Lengthen Intrinsic Neck Flexors

- Longus capitis
 - TP's C3-6 > Occiput
- Longus colli
 - TP's C3-C5 > C1 arch
 - Bodies of T1,2,3 > TP's C5,6
 - Bodies of C5-7, T1-3 > Bodies of C2,3,4

Mechanical Neck Pain - Porterfield & DeRosa

Deep Neck Flexor Muscle Weakness





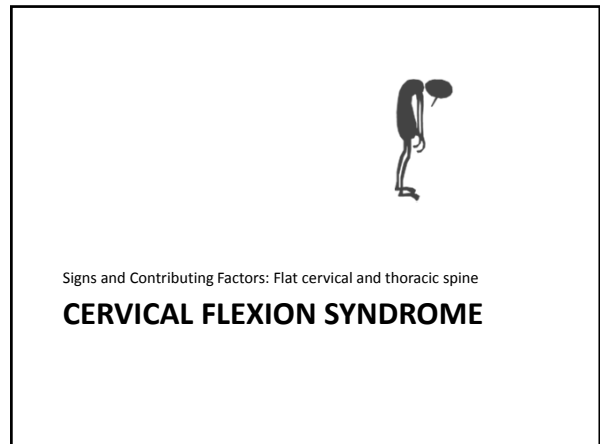
**Dominant Extrinsic
Neck Flexors**

Scaleni:
Anterior - TP'sC3-6> 1st rib
Middle - TP'sC2-7> 1st rib
Posterior - TP'sC5-7>1st rib

Function:
Flexion with anterior shear

Depressed chest affects
cervical alignment

Mechanical Neck Pain - Porterfield & DeRosa



**Cervical Flexion and Flat Thoracic
Spine**

Kendall 1993

Cervical Lordosis with thoracic kyphosis

Impaired Correction

Kendall 1993

Another form of Flexion Syndrome: Swayback

SCALENE MUSCLE RESTRICTION

