



EXERCISE PRESCRIPTION

PART 2

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Orthopaedic Manual Physical Therapy Series
Charlottesville 2017-2018



Orthopaedic Manual Physical Therapy Series 2017-2018

Exercise Prescription

- Consult CPR/Literature
- Force
 - Direction & Task Specific
- Dosage
 - Task Specific
- Progressions



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CLINICAL GUIDELINES

JOHN D. CHILDS, PT, PhD • JOSHUA A. CLELAND, PT, PhD • JAMES M. ELLIOTT, PT, PhD • DEYDRE S. TEYHEN, PT, PhD
ROBERT S. WAINNER, PT, PhD • JULIE M. WHITMAN, PT, DSc • BERNARD J. SOPKY, MD
JOSEPH J. GODGES, DPT • TIMOTHY W. FLYNN, PT, PhD

Neck Pain:

*Clinical Practice Guidelines Linked to
the International Classification of
Functioning, Disability, and Health From
the Orthopaedic Section of the American
Physical Therapy Association*

J Orthop Sports Phys Ther 2008;38(9):A1-A34. doi:10.2519/jospt.2008.0303



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Recommendations

- Interventions
 - Cervical Mobilization/Manipulation=A
 - **Coordination, Strengthening, Endurance=A**
 - Thoracic Mobilization/Manipulation = C
 - Stretching Exercises = C
 - Centralization procedures and exercises = C

A=Strong Evidence- Preponderance of Level I and/or Level II studies support the recommendation. Must include at least one Level I study

C=Weak Evidence- A single Level II study or preponderance of Level III and IV studies including statements of consensus by context experts support the recommendation



Orthopaedic M

A

Recommendation: Clinicians should consider the use of coordination, strengthening, and endurance exercises to reduce neck pain and headache.

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Exercises for mechanical neck disorders (Review)

Gross A, Kay TM, Paquin JP, Blanchette S, Lalonde P, Christie T, Dupont G, Graham N, Burnie SJ, Gelley G, Goldsmith CH, Forget M, Hoving JL, Brønfort G, Santaguida PL, Cervical Overview Group
Cochrane Database of Systematic Reviews 2015, Issue 1. Art. No.: CD004250.

- Exercise is beneficial for the treatment of chronic neck pain, cervicogenic headaches and cervical radiculopathy
 - Exercise directed at neck, shoulder and scapular regions



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Effect of Therapeutic Exercise on Pain and Disability in the Management of Chronic Nonspecific Neck Pain: Systematic Review and Meta-Analysis of Randomized Trials

Physical Therapy Volume 93 Number 8
August 2013

Lucia Bertozzi, Ivan Gardenghi, Francesca Turoni, Jorge Hugo Villafañe, Francesco Capra, Andrew A. Guccione, Paolo Pillastrini

- Significant effect size of therex on pain
- Medium, non significant effect size of therex on disability
- Supports use of therex in management of chronic nonspecific neck pain



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The Effect of Different Exercise Programs on Size and Function of Deep Cervical Flexor Muscles in Patients With Chronic Nonspecific Neck Pain

A Systematic Review of Randomized Controlled Trials

Somayeh Amiri Arimi, PT, Mohammad Ali Mohseni Bandpei, PT, PhD, Khodabakhsh Javanshir, PT, PhD, Asghar Rezasoltani, PT, PhD, and Akbar Biglarian, PhD

- 268 studies evaluated, 9 included in review
- All RCTs
- Exercise interventions included cervical flexor exercise, general strengthening, stretching exercises
- Deep cervical flexor exercise groups showed reduced pain, improved function, increased longus colli diameter, improved performance of CCF test



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American Journal of Physical Medicine & Rehabilitation • Volume 96, Number 8, August 2017

THE EFFECT OF 3 DIFFERENT EXERCISE APPROACHES ON NECK MUSCLE ENDURANCE, KINESIOPHOBIA, EXERCISE COMPLIANCE, AND PATIENT SATISFACTION IN CHRONIC WHIPLASH

Gunnel E. Peterson, MSc, PT,^{a,b} Maria H. Landén Ludvigsson, MSc, PT,^{c,d} Shaun P. O'Leary, PhD, PT, Åsa M. Dederig, PT,^{g,h} Thorne Wallman, PhD, MD,^{i,j} Margaretha I.N. Jönsson, MSc, PT,^k and Anneli I.C. Peolsson, PT^{l,m}

- 3 groups
 - Neck specific exercise
 - Neck specific exercise with behavioral approach
 - General exercise
- Neck specific exercise groups displayed improved DCF strength, reduced pain and increased satisfaction with treatment compared to general exercise group
- Supports neck specific exercise as a treatment for chronic whiplash



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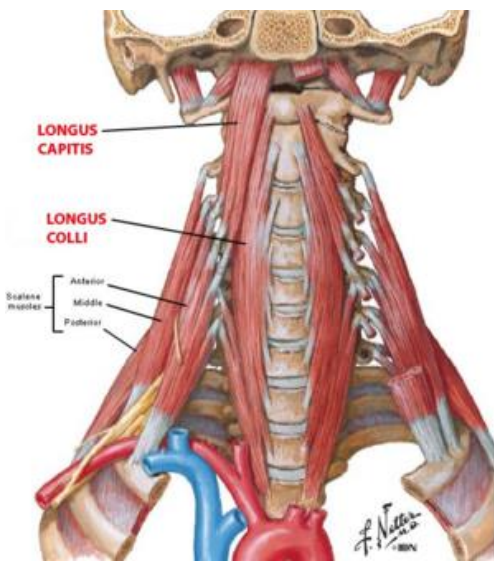
Journal of Manipulative and Physiological Therapeutics
Volume 38, Number 7

Does increased superficial neck flexor activity in the craniocervical flexion test reflect reduced deep flexor activity in people with neck pain? Gwendolen Jull ^{a,*}, Deborah Falla ^b *Manual Therapy 25 (2016) 43–47*

- EMG was recorded from the sternocleidomastoid, anterior scalene and deep cervical flexor
- Support interpretation that increased activity of superficial flexors indicate less activation of deep flexors
 - Primarily SCM



Deep Cervical Flexors



- Longus Capitus
- Longus Colli
- Function
 - Craniocervical flexion
 - Feed forward mechanism for cervical stabilization



The Change in Deep Cervical Flexor Activity After Training Is Associated With the Degree of Pain Reduction in Patients With Chronic Neck Pain

Deborah Falla, PhD,*† Shaun O'Leary, PhD,‡ Dario Farina, PhD,† and Gwendolen Jull, PhD‡
Clin J Pain • Volume 28, Number 7, September 2012

- Specific training of deep cervical flexors resulted in reduced pain in patients with chronic neck pain
- Correlated with increased EMG activity of longus colli and longus capitus

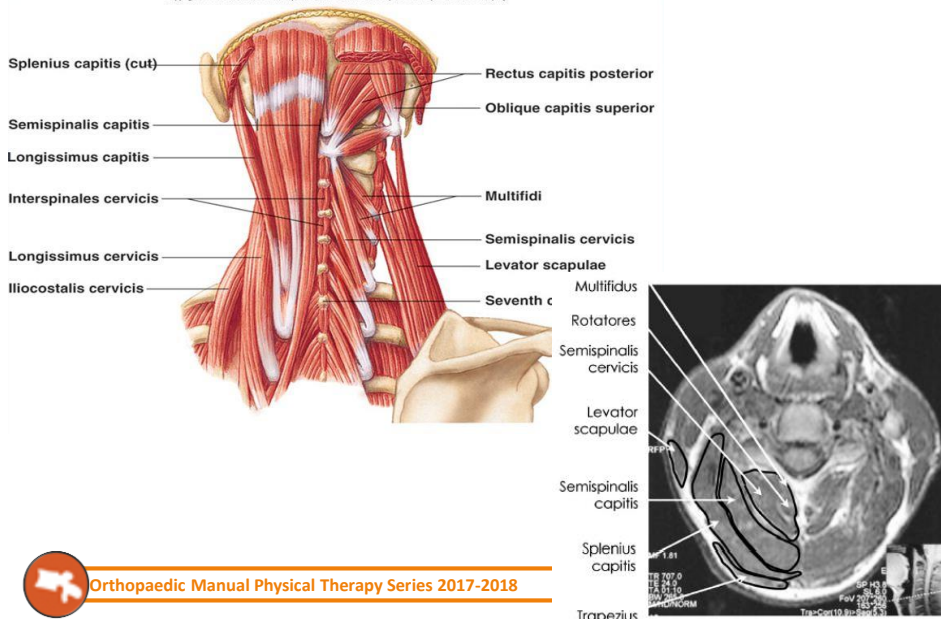


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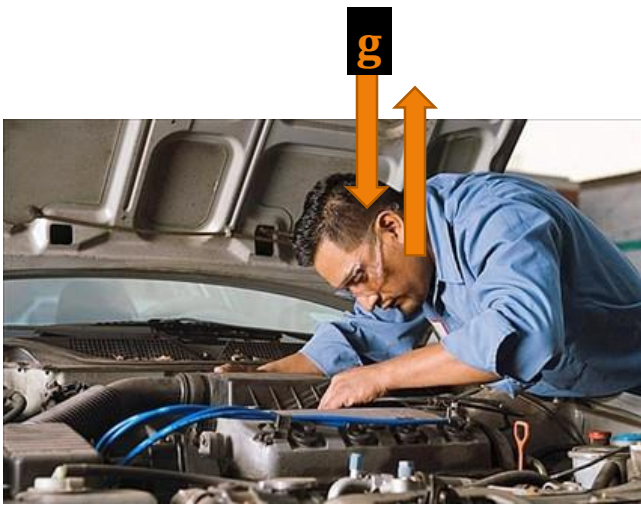
Cervical Extensors

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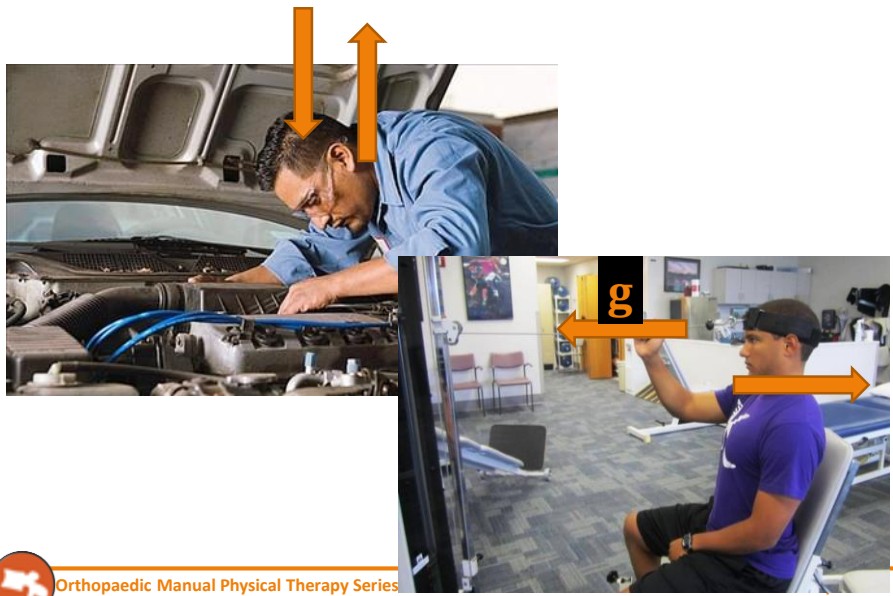


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The Effect of g



What Do We Do In Treatment?



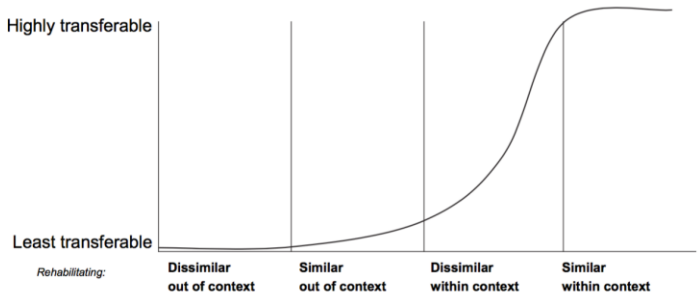
The Effect of g



What Do We Do In Treatment?



Task Specificity



| | | | | |
|---------------------------|----------------------------|--|--------------------------------|------|
| Trunk Control during gait | Pelvic tilts on the plinth | Laying on the floor moving legs in a walking pattern | Core activation during walking | Walk |
|---------------------------|----------------------------|--|--------------------------------|------|

Lederman 2010



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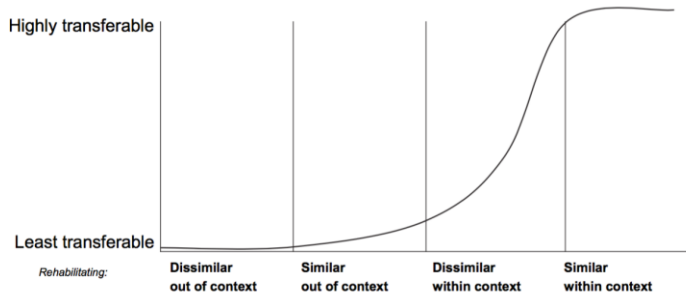
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Task Specificity



| | | | | |
|--|-------------------|---------------------------------|---|-----------------------------------|
| Neck stabilization during changing tires | Supine chin tucks | Supine chops with medicine ball | Standing chin tuck with theraband resisted shoulder flexion | Heavy floor to shoulder box lifts |
|--|-------------------|---------------------------------|---|-----------------------------------|

Lederman 2010



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Dosage

- Exercise must be dosed specifically for the injured tissue and healing state.
 - Too aggressive will be destructive
 - Too conservative will have no effect
- Must match the patient's health state and pathology
- Can be for the purpose of pain inhibition, decreasing muscle guarding, reducing edema, increasing tissue tolerance to tension/compression and improving joint mobility
- Specific to task or goals



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Progression: RAMS

- **R**etrain
 - Control of Muscles
- **A**ttain
 - Available Range for Task
- **M**aintain
 - Maintain/control position against gravity
- **S**ustain
 - Maintain control during activity


A. Russell Smith Jr. PT, EdD, OCS, FAAOMPT



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Progression

- 
- Preparation Phase
 - Phase I: **Static** Stabilization
 - Phase II: **Transitional** Stabilization
 - Phase III: **Dynamic** Stabilization
 - Function



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- 50 yom mechanic gradual insidious onset of neck pain worsening over the past 6 months
- Dull pain midline CTJ area, sharp at times
- Aggs: work: leaning over cars, does ok if under or beside car; prolonged sitting
- Eases: head support, laying down
- Negative neuro exam
- ROM: pain at end range extension, flexion WNL tight, B Rotation tight at end ranges
- Strength: Shoulder girdle grossly 4-/5
- DCF endurance test 20 sec (normal=46 sec)
- Cervical extension MMT weak/painful

Case Example



Progression

- **R**etrain
 - Control of Muscles
- **A**ttain
 - Available Range for Task
- **M**aintain
 - Maintain/control position against gravity
- **S**ustain
 - Maintain control during activity

Phase I: **Static**
Stabilization

Phase II: **Transitional**
Stabilization

Phase III: **Dynamic**
Stabilization



- **R**etrain
 - Control of Muscles
- **A**ttain
 - Available Range for Task
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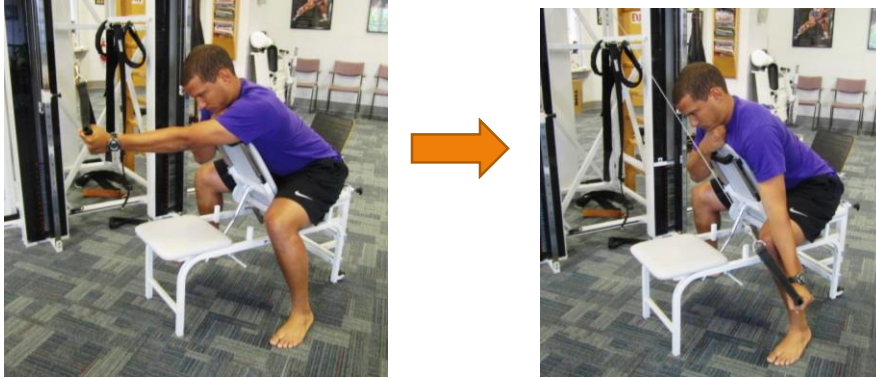
Cervicothoracic MET



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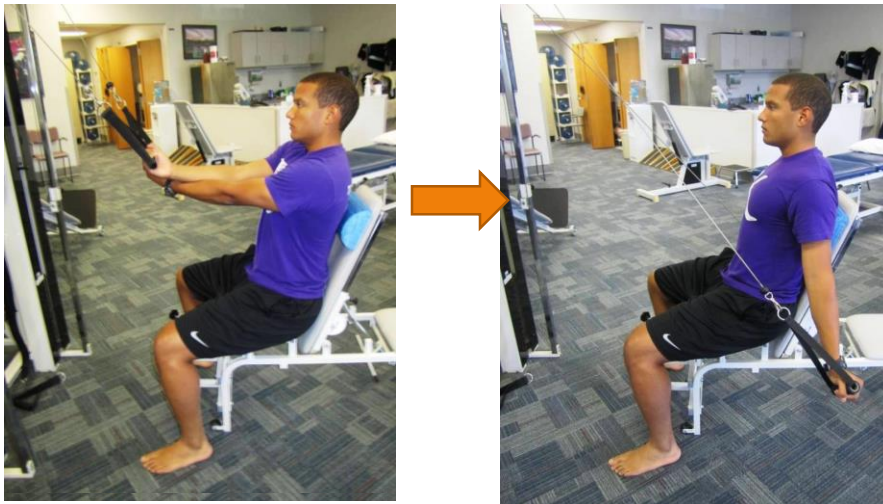
Cervical Stabilization: Postural Emphasis



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Cervical Stabilization with Postural Emphasis



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Cervical Stabilization: Postural Emphasis



Cervical Stabilization: Postural Emphasis



Motor Control: DCF/Rotation Emphasis



Motor Control: DCF/Rotation Emphasis

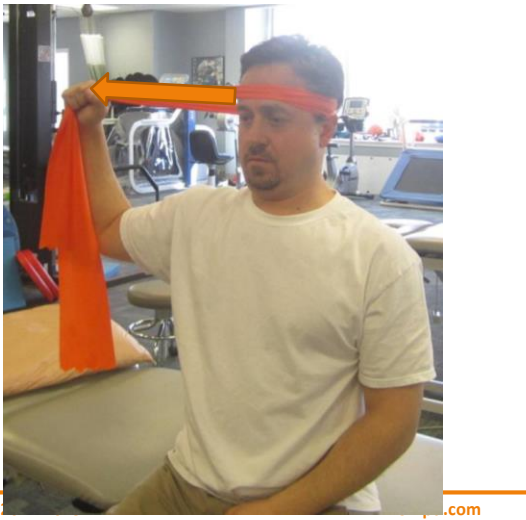


Motor Control: DCF/Rotation Emphasis

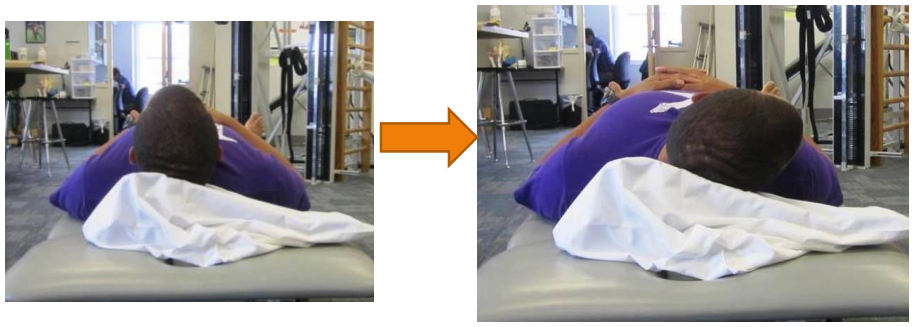


Motor Control: DCF/Rotation Emphasis

- Band Alternative



Motor Control: DCF/Rotation Emphasis



Motor Control: DCF/Rotation Emphasis



Thoracic Mobility: Foam Roll



Relaxed Breathing



"Tin Soldiers"



"Punches"



"Hugs"

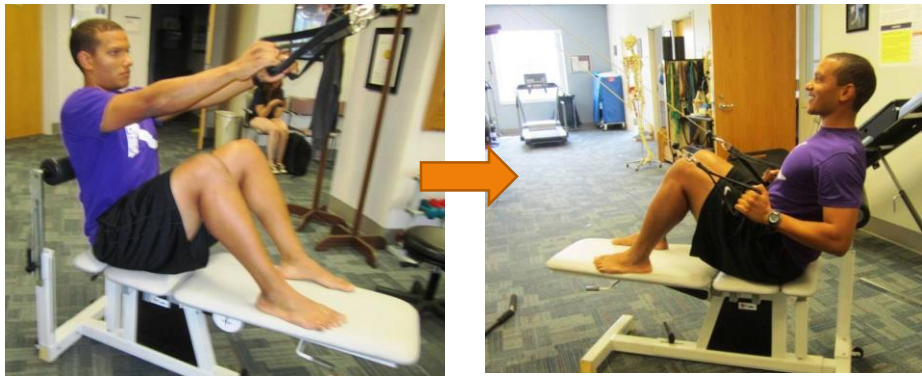


"Angels"

Thoracic Mobility



Thoracic Mobility



Thoracic Mobility



Thoracic Mobility



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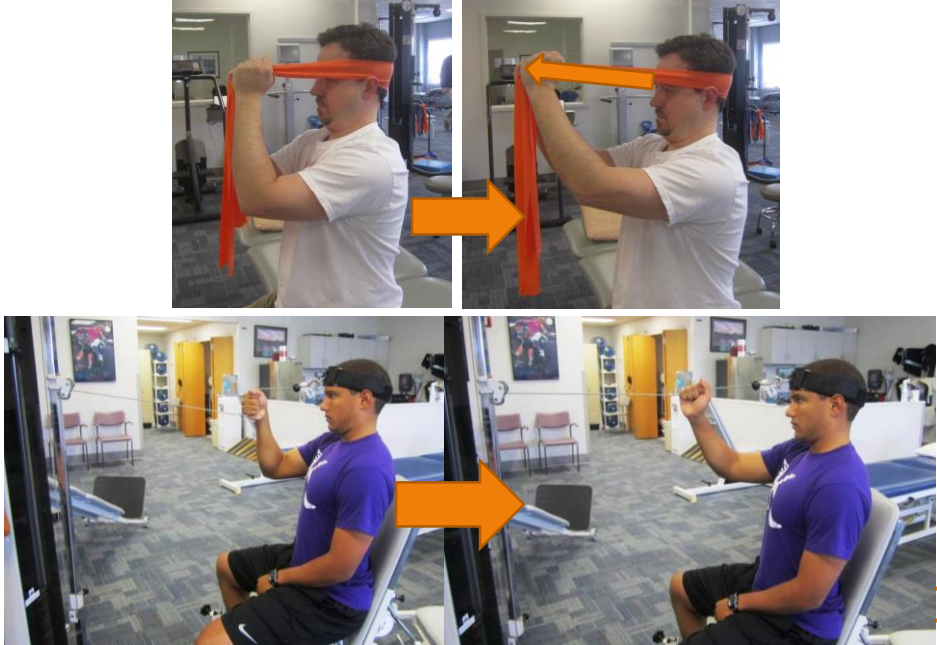
Motor Control: DCE Emphasis



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Motor Control: DCE Emphasis



Motor Control: DCE Emphasis



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Advanced Motor Control

