AMERICAN BURN ASSOCIATION’S
PT/OT SPECIAL INTEREST GROUP
Seattle, Washington
Tuesday, April 24, 2012

Chair: Sam K. Yohannan, PT, DPT, MS
NewYork-Presbyterian/Weill Cornell Medical Center, New York, NY
say9005@nyp.org

Co-Chair: Trudy Boulter, OTR/CHT
Children’s Hospital Colorado, Denver, CO
trudy.boulter@childrenscolorado.org

Co-Chair: David Lorello, PT, DPT
Arizona Burn Center, Phoenix, AZ
david.lorello@mihs.org

Burn Rehabilitation of the Shoulder Complex
The OT/PT SIG will focus on burn rehabilitation of the shoulder region. Professors from the University of Washington will provide lectures on anatomy, kinesiology, and current evidence. Thereafter, breakout groups will facilitate further exploration by providing hands-on learning, problem-solving and discussion. Lab attire recommended.

Agenda

8:00 --8:50 Welcome & Business Meeting
1. MAC Update
2. Announcements
3. Abstract Manuscript Submission Update
4. Burnterapist.com update
5. Barbara Knothe Burn Therapist Achievement Award
6. Introduction of Topics and Speakers

8:50 --9:20 Lecture 1 (Anatomy): The Shoulder: More Than Skin Deep A Delicate Balance Under the Best of Circumstances
- Kim Bennett, PhD, PT
  Division of Physical Therapy
  University of Washington, Seattle, WA

- Murray Maitland, PhD, PT
  Division of Physical Therapy
  University of Washington, Seattle, WA

9:50--10:00 Q & A with Drs. Bennett and Maitland

10:00 --10:15 Break and Refreshments provided by Bio-Concepts, Inc.
Rotate Through All 3 Breakout Sessions on the Shoulder Complex (30 minutes each)

10:15-11:45

**Breakout 1: Soft Tissue & Joint Mobilization**

**Leaders:**
Kim Bennett, PhD, PT  
*Division of Physical Therapy, University of Washington, Seattle, WA*

Lesley Palmgren, PT, MPT  
*Harborview Medical Center, Seattle, WA*

**Assistants:**
Jennifer Howe, MPT CMPT  
*Division of Physical Therapy, University of Washington, Seattle, WA*

Sarah Brown, PT, DPT  
*Harborview Medical Center, Seattle, WA*

Sarah McDonel, PT, DPT  
*Harborview Medical Center, Seattle, WA*

**Breakout 2: Positioning & Splinting**

**Leaders:**
Trudy Boulter, OTR/CHT  
*Children’s Hospital Colorado, Denver, CO*

**Assistants:**
Carrie Laker, PT, DPT  
*University of Colorado Hospital, Denver, CO*

Darcie Luby, PT, DPT  
*University of Colorado Hospital, Denver, CO*

Jennifer Pauley, MS, OTR  
*University of Colorado Hospital, Denver, CO*

**Breakout 3: Therapeutic Exercise**

**Leaders:**
Elise Carney, PT  
*NewYork-Presbyterian/Weill Cornell Medical Center, New York, NY*

Malvina Sher, PT  
*NewYork-Presbyterian/Weill Cornell Medical Center, New York, NY*

11:45--12:00  Final Comments and Wrap-Up
**Anatomy Lecture**

Learners will be able to:

- Recall the basic skeletal, fascial, muscle and nerve anatomy of the pectoral girdle and its relationship to the anatomy of the spine.
- Understand the effect of spine and shoulder positioning on pectoral girdle, glenohumeral, cervicothoracic, and nerve structures.
- Appreciate that restoration of fascial, muscle and articular alignment underlies improved shoulder function.

**Kinesiology Lecture**

Learners will be able to:

- Provide at least two examples of physiologic risk factors.
- List anatomical structures most likely to be the source of symptoms.
- Describe muscle force coupling that prevents impingement.
- Understand how the sum of physiologic, anatomical and kinetic inputs results in a patient-specific, multifactorial causation of kinematic chain dysfunction.
- Extrapolate clinical findings to indications for intervention strategies.
Burn Rehabilitation of the Shoulder Complex: Objectives
ABA OT/PT SIG, April 24, 2012

Breakout Session: Soft Tissue and Joint Mobilization

Participants will be able to do:
- Basic fascial releases for the pectoral, anterior cervical and scapulohumeral fascia.
- Scapulothoracic mobilization.
- Perform glenohumeral mobilizations to increase posterior and inferior humeral glides.
- Muscle energy and direct mobilization to the first rib to restore normal alignment after prolonged scalene shortening.

Breakout Session: Positioning and Splinting

Participants will be able to demonstrate:
- Trial application of a dressing to facilitate thoracic extension and chest expansion
- Practice application of a dressing to facilitate external rotation and abduction of the shoulder
- Discussion of current splints, casts and positional devices used for immobilization
  - Review of samples and photos provided from a variety of clinical settings.
- Application of kinesiotape to facilitate the following:
  - Thoracic extension
  - Chest expansion
  - Shoulder stabilization

Breakout Session: Therapeutic Exercise

Participants will be able to demonstrate:
- Yoga flow stretching exercises for the glenohumeral joint and trunk.
- Integration of scapula and core stabilization for postural control.
- Progression of eccentric and isotonic/plyometric exercises with evidence based home exercise program.
MEMBERSHIP ADVISORY COMMITTEE

The Membership Advisory Committee (MAC) committee is comprised of dedicated non-physician burn care professionals who serve the ABA in a variety of ways. It is the responsibility of all MAC members to facilitate the appropriate expression of concerns, questions, issues, needs and recommendations that the At-Large Members wish to bring before the Board of Trustees. Members of the MAC Committee attend each of the SIG meetings at the annual meeting in order to disseminate information regarding the ABA activities and general ABA information and opportunities.

Membership Advisory Committee Therapist Members:
Mary Jo Baryza PT, PCS, Ex Officio
Ingrid Parry, MS, PT, Vice Chair
Michael A. Serghiou OT, MBA
Dana Y. Nakamura, OTR/L, CLT, CLMC

SPECIAL INTEREST GROUPS

Background
Special Interest Groups (SIGs) originated out of the expressed need of the ABA membership to have small, informal groups in which to link with others with similar interests in an effort to exchange ideas, network with colleagues, share information and problem-solve. As the ABA grew, so did the number of SIGs. By 2003, there were 18 SIGs ranging in size from 10 to over 300 individuals attending various SIG meetings in conjunction with the ABA Annual Meeting.

The Special Interest Groups (SIG) hold meetings in conjunction with the Annual Meeting of the ABA. These meetings provide an opportunity for exchange of ideas, networking with colleagues, and information sharing. All ABA meeting participants are encouraged to attend these meetings, which are scheduled at times that do not conflict with the general meeting. These meetings are open to both members and nonmembers of the ABA.

Physical Therapy / Occupational Therapy (PT/OT)
This SIG provides opportunities for professional exchange of ideas, with colleagues on new treatment methods, research activity and clinical problem solving. Another focus is to encourage burn therapist involvement in the ABA. We have recently instituted a three year plan with two Co-Chairs to ensure continuity and consistency.

2012 Chair: Sam K. Yohannan MS, PT, DPT
2012 Co-Chair: Trudy Boulter, OTR/CHT
2012 Co-Chair: David Lorello, PT, DPT
Additional 2012 Committees with Therapist Membership

**Aftercare Reintegration Committee**
Dana Y. Nakamura, OTR/L, CLT, CLMC  
Tracy Gaboury, OTR/L

**Archives Committee**
Reginald L. Richard, PT, MS

**Ethical Issues Committee**
Patricia A. Sharp, OTR/L

**International Outreach Committee**
Sam K. Yohannan, PT, MS  
Beth A. Costa, OTR/L

**Program Committee**
Ingrid S. Parry, MS, PT, *Ex Officio*

**Rehabilitation Committee**
**Bernadette Nedelec, PhD, BSc, OT, Chair**  
Haley A. Derksen, PT, BMR  
Jennifer C. Arndt, OT  
Sean M. Hightower, OT  
Lesley Palmgren, PT  
Ingrid S. Parry, MS, PT  
Melinda Shetler, OT

**Research Committee**
Lan Van-Buendia, MS, OTR/L

**Verification Committee**
Reginald L. Richard, PT, MS
Sydney Jane Thornton, OTR/L, has been a dedicated and contributing Occupational Therapist for over 41 years of clinical practice. For more than 31 of these years, she has been specifically focused on the rehabilitation of children and adult burn survivors at the North Carolina Jaycee Burn Center and has served as the cornerstone rehabilitation leader for this burn team.

Sydney was a pioneer in upper extremity prosthetic training and rehabilitation following digit replantation surgery in her early career and thrived in rehabilitating the most difficult crush, amputation or mutilating hand injuries. She was invited to be part of the keystone meetings for hand therapists that later resulted in establishment of 2 fundamental hand therapy organizations: the American Society of Hand Therapists and the Philadelphia Hand Society & Conference. In addition to the American Society of Hand Therapists, Sydney’s has also been an active member in the American Occupational Therapy Association, North Carolina Occupational Therapy Association, and the American Burn Association throughout her career.

Sydney is chapter author for three essential clinical texts spanning multiple medical disciplines: Upper Extremity Amputee- Prosthetic Training Programs in the Rehabilitation of the Hand: Surgery & Therapy, Post Operative Management in Replantation, for the American Academy of Orthopedic Surgeons and Enabling Life Roles after Severe Burns for the American Occupational Therapy Association. Sydney has also authored articles in both the Journal of Burn Care and Rehabilitation and the Annals of Plastic Surgery.

However, Sydney’s most enjoyed contributions are realized in her participation in oral presentations, lectures and hands on teachings in burn care which reflect a life-long devotion to burn rehabilitation science, education, and aftercare. Sydney has been an active contributor to the Southern Region Burn Conference, North Carolina Occupational Therapy Conference, World Burn Congress and AOTA’s Burn Rehabilitation Workshop. Moreover, Sydney’s’ devotion to burn care extends to the generations of students, therapists, nurses and surgeons who have been fortunate to have her as an instructor and mentor for burn rehabilitation. Many have gone on continue working with burn survivors and have developed into key burn clinicians and educators; yet all have left much richer and knowledgeable from the experience. In both the classroom and the clinic, Sydney has been able to demonstrate by example and practice the vital links between academia and practice.

Sydney endears herself to her patients and their families through her advocacy and devotion in helping them to achieve maximum functional recovery. Sydney is known for doing what it takes to provide for her patients and it is not uncommon to meet a burn survivor in North Carolina for whom Sydney has been nothing short of a lifelong good friend. Her sheer talent, work ethic, and selflessness serve as motivation to the multitudes of patients and coworkers she inspires daily. It is this unyielding dedication to burn rehabilitation and fundamental application of this philosophy which makes Sydney an essential resource to the burn community and a beacon of clinical burn rehabilitation.
The **BurnTherapist.com** web site – is the first site dedicated to the work and endeavors of Burn Occupational & Physical Therapists in an effort to develop outcome based research and clinical improvements for all burn survivors. We are committed to fostering collaborative networking relationships among burn therapists as well as developing clinical research, treatment innovations and improvement in service delivery and care at local, national and international levels.

We also highlight the achievements of Burn Occupational & Physical Therapists as part of the American Burn Association's Occupational & Physical Therapist Special Interest Group through the yearly Barbara Knothe Burn Therapist Achievement Award. We are a resource for therapist driven research and collaboration to provide the best treatment outcomes for the patients that we serve.

**Burn Clinical Pearls (formerly Splinting Quarterly)**

Each Quarter (January, April, July & October) we will highlight a splinting endeavor that has been created to work with a challenging surgical intervention or as a result of a unique patient need or request. New designs as well as modifications to an existing, established design are welcomed. Post-operative splints as well as adaptive device splints, casting and any other type of ADL modification gladly are welcome. We will also be archiving all of the submissions so that we can maintain a resource of burn splinting knowledge. Contribute to the accumulated knowledge and submit your splint design to today!

Go to the web site [www.burntherapist.com](http://www.burntherapist.com) and get involved!
2012 AMERICAN BURN ASSOCIATION’S PT/OT SPECIAL INTEREST GROUP
COMMITTEE AND PRESENTERS

Sam K Yohannan, PT, DPT, MS
Chair
NewYork-Presbyterian/Weill Cornell Medical Center, New York, NY
say9005@nyp.org

Sam has over a decade of physical therapy experience in a variety of
rehabilitative settings across the United States and abroad. He is the senior
physical therapy specialist and research coordinator on the burn unit at
NewYork-Presbyterian/Weill Cornell Medical Center. Sam has been an
active member of the American Physical Therapy Association since 1997. He
has published and reviewed research on burns, is an editor for the Games for
Health Journal and co-chair for its Sensorimotor Section. Sam has been an
affiliate of the American Burn Association since 2007 and serves as a
member of its Rehabilitation and International Outreach Committees.

Trudy Boulter, OTR/CHT
Co-Chair; Leader – Breakout Session 2: Positioning and Splinting
Children’s Hospital Colorado, Denver, CO
trudy.boulter@childrenscolorado.org

Trudy is an advanced practitioner specializing in upper extremity trauma,
burn injuries and congenital differences. In addition to specialized clinical
care at Children’s Hospital Colorado, she is the director of Children’s
Hospital Colorado Burn Camps Program, a specialized program to meet the
emotional and physical challenges children often experience following a
traumatic burn injury. She is a member of the American Burn Association,
the American Camping Association and the American Society of Hand
Therapists. Trudy also serves on the board for the International Association
of Burn Camps.

David Lorello, PT, DPT
Co-Chair
Arizona Burn Center, Phoenix, AZ
david.lorello@mihs.org

David is a physical therapist at the Arizona Burn Center. He has spoken
about the rehabilitative needs of the burn survivor at multiple conferences
including the Combined Sections Meeting of the American Physical Therapy
Association (2009 – 2012), the Western Region Burn Conference (2009),
the American Burn Association (2007) and the Arizona Burn Symposium
(2006-2011). In 2011, David presented his paper entitled, Prospective
Randomized Controlled Trial of Early Ambulation for Patients with Lower
Extremity Grafts at the American Burn Association Conference in Chicago.
David has been serving as a Co-Chair for the PT/OT Special Interest Group
since 2011.
Kim Bennett, PhD, PT
Lecturer – Lecture 1 (Anatomy): The Shoulder: More Than Skin Deep A Delicate Balance Under the Best of Circumstances; Leader – Breakout Session 1: Soft Tissue and Joint Mobilization
Division of Physical Therapy, University of Washington, Seattle, WA
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Kim received her PhD from UCLA School of Medicine Department of Anatomy and her PT degree from Northwestern University. She has taught human gross anatomy at UCLA, Northwestern and the University of Washington to medical, dental and physical and occupational therapy students. She has practiced physical therapy for 30 years, predominately in an orthopedic outpatient setting. Her area of special interest lies at the intersection of rheumatology, chronic orthopedic conditions and chronic pain. She has written textbook chapters on exercise in rheumatology and in chronic pain, as well as chapters in the popular press for active lay people interested in conditioning and for people learning to live with chronic pain. She is involved in research on the effect of yoga on arthritis pain and on the effects of teaching patients about the neurophysiology of pain and on pain self-management.

Murray Maitland, PhD, PT
Lecturer – Lecture 2 (Kinesiology): The Shoulder: Kinematic, Kinetic, Anatomical and Physiologic Chain Concepts of the Shoulder Complex
Division of Physical Therapy, University of Washington, Seattle, WA
mmaitlan@u.washington.edu

Murray received his BSR from the University of British Columbia in both PT and OT. After a few years of clinical practice, he returned for an MSc in anatomy, followed by a PhD in Clinical Biomechanics from the University of Calgary. He has over 20 years of clinical experience complemented by 35 peer-reviewed research and academic papers in the fields of biomechanics, orthopaedic examination, and clinical problem solving. Currently, he teaches extremity orthopaedic physical therapy and differential diagnosis for the Division of Physical Therapy at the University of Washington. Murray has been a strong advocate for refining and enhancing the constructs of Physical Therapy as well as helping professionals translate their learning into practice. His favorite pastimes involve endurance running, paddling and cycling in natural environments. In 2010, he did four 24-hour races with outcomes ranging from first to 6th place.

Lesley Palmgren, PT, MPT
Leader – Breakout Session 1: Soft Tissue and Joint Mobilization
Harborview Medical Center, Seattle, WA
palmgren@u.washington.edu

Lesley is a physical therapist at the University of Washington Burn Center at Harborview in Seattle. She has been working in burns nearly 5 years and has over 10 years experience in a wide variety of settings in various states. As a burn therapist, she treats patients across the continuum of care. She has been a member of the American Physical Therapy Association since 1997 and of the American Burn Association since 2006. She has been a member of an international outreach rehabilitation team. Lesley has lectured and presented research on burn rehabilitation locally and nationally.
Jennifer Howe, MSPT CMPT  
Assistant – Breakout Session 1: Soft Tissue and Joint Mobilization  
Division of Physical Therapy, University of Washington, Seattle, WA  
jenhowe@uw.edu

Jennifer graduated from the University of North Dakota in 2001 with a Masters in Physical Therapy. In 2008 she completed her testing through the North American Institute of Orthopedics and Manual Therapy for a Level III certification in manual therapy. This training focuses on specific assessment and treatment of all extremity joints, as well as a comprehensive approach to the spine. She enjoys combining her manual therapy background with exercise and movement education to address her patient’s needs. Jennifer works at Life in Balance Physical Therapy in West Seattle as well as at the University of Washington where she assists in teaching a class on the spine to the physical therapy students.

Sarah Brown, PT, DPT  
Assistant – Breakout Session 1: Soft Tissue and Joint Mobilization  
Harborview Medical Center, Seattle, WA  
browns7@uw.edu

Sarah graduated with her DPT from the University of Washington in 2011. She currently works as a physical therapist in the burn unit at Harborview Medical Center in Seattle. Sarah works primarily in acute and intensive care settings, and enjoys working with the interdisciplinary burn team as well as the diverse spectrum of patients served at Harborview.

Sarah McDonel, PT, DPT  
Assistant – Breakout Session 1: Soft Tissue and Joint Mobilization  
Harborview Medical Center, Seattle, WA  
sjanemcd@uw.edu

Sarah received a Doctorate in Physical Therapy from the University of Washington in 2011. She currently provides physical therapy services in the inpatient burn unit at Harborview Medical Center to patients in intensive care and acute care. She enjoys working with the richly diverse adult and pediatric populations presenting to Harborview.
Carrie Laker, PT, DPT
Assistant– Breakout Session 2: Positioning and Splinting
University of Colorado Hospital, Denver, CO
carrie.yenne@uch.edu

Carrie has been a physical therapist in burn rehabilitation for 10 years, both at the University of Colorado Hospital in Denver, Colorado and the University of Washington Burn Center at Harborview in Seattle, Washington. She graduated with a Masters in Physical Therapy from the University of Kansas Medical Center in 2001 and has been an active member of the American Physical Therapy Association since 1999. She has been credentialed as a Certified Wound Specialist from the American Academy of Wound Management since 2005. Carrie completed a transitional Doctorate in Physical Therapy degree from Regis University in 2008 and has been an Affiliate Faculty member at Regis University Program in Physical Therapy since 2006. She has been a member of the American Burn Association since 2002 and is currently a member of the Rehabilitation Committee.

Darcie Luby, PT, DPT
Assistant– Breakout Session 2: Positioning and Splinting
University of Colorado Hospital, Denver, CO
darcie.luby@uch.eu

Darcie graduated from Chatham University, in Pittsburgh, PA, in 2005 with a Doctorate of Physical Therapy. She has been working at the University of Colorado Hospital since 2006, and has been the primary PT for the Burn/Trauma Intensive Care Unit (BTICU) for the past 4 years. In addition to working in the BTICU, she also works in the Neuro ICU. Darcie sees this as the best of both worlds, as burn and neurology are her two passions. In her spare time, she enjoys spending time with her daughter and husband, both of which keep her very busy. She also loves watching football, playing soccer, and enjoying the beautiful Colorado scenery while hiking.

Jennifer Pauley, MS, OTR
Assistant– Breakout Session 2: Positioning and Splinting
University of Colorado Hospital, Denver, CO
jennifer.pauley@uch.edu

Jennifer graduated with her Master's in Occupational Therapy from Colorado State University in 2005. She has practiced in the acute care setting for 6 years. She has been a burn therapist for 5 1/2 years at the University of Colorado Hospital. Jennifer keeps very busy when she is not at work chasing around her 2 kids, a little boy and girl. They keep her on her toes.
Elise Carney, PT  
**Leader - Breakout 3: Therapeutic Exercise**  
*NewYork-Presbyterian/Weill Cornell Medical Center, New York, NY*

elisecarney@gmail.com

Elise graduated from Ithaca College with a BS in Clinical Science and a MS in Physical Therapy in 1999/2000. She started her career working on the acute care rotation at Bellevue Medical Center in Manhattan prior to accepting a position at NewYork-Presbyterian/Weill Cornell Medical Center. She has rotated to the inpatient department including William Randolph Heart Burn Center prior to returning to the outpatient department. She is a senior therapist and has advanced her clinical skills in orthopedics, neurology, spine and hemophilia. Elise is a recipient of the James McDonald Vacation Award given to a therapist for their dedication and effort to the burn patient population.

Malvina Sher, PT  
**Leader - Breakout 3: Therapeutic Exercise**  
*NewYork-Presbyterian/Weill Cornell Medical Center, New York, NY*

mas9062@nyp.org

Malvina graduated from Hunter College with a BS in Clinical Science in 2011. She has been a member of the burn rehabilitation team at NewYork-Presbyterian/Weill Cornell Medical Center since September 11th, 2001 and has served as a clinical specialist since 2008. She has been a member of the American Burn Association since 2004 and is a regular contributor to burntherapist.com. She has been a presenter at multiple American Burn Association and International Society Burn Injury conferences. Malvina’s interests include laser scanning and rehabilitative management of face and neck burns.
Lecture 1 (Anatomy):

The Shoulder: More Than Skin Deep
A Delicate Balance Under the Best of Circumstances

By Kim Bennett, PhD, PT
The Shoulder: More Than Skin Deep

A DELICATE BALANCE UNDER THE BEST OF CIRCUMSTANCES

KIM BENNETT PT PHD
UNIVERSITY OF WASHINGTON
DEPARTMENT OF REHABILITATION MEDICINE

With Special Thanks to

Leslie Palmgren PT MPT
UW Medicine Regional Burn Center at Harborview

for advice and photos

The Problem
Compound That in Your Burn Patients With

- Contractures
- Prolonged compromise/d positions
- Abnormal breathing patterns
- Pain and pain management strategies
- Emotional reactions

And You Have A Challenge

Objectives:
- Review anatomy of the glenohumeral, scapulothoracic, and scapulocervical regions:
  - Bones and joints
  - Muscles
  - Nerves
  - Fascia
- Give a brief overview of the effect of compromise/d positions on these structures and the effect of that on shoulder function
- Lay the framework for the interventions demonstrated in the manual therapy breakout session

More Than Skin Deep: Bones and Joints of the Pectoral Girdle and Shoulder

The Pectoral Girdle consists of the scapulae and the clavicles and it suspends the whole UE

Note: there is only one bony attachment of the pectoral girdle to the trunk
More Than Skin Deep: Joints of the Pectoral Girdle and Shoulder

- Synovial Sternoclavicular Joint
- Fibrous Costoclavicular Joint
- Synchondrous First Sternocostal Joint

* Functional significance of first rib articulating only with first T/S vertebra:

More Than Skin Deep: Joints of the Pectoral Girdle and Shoulder

- Synovial AC Joint
- Coracoclavicular Ligaments
- Glenohumeral Ligaments: Anterior, middle and inferior

More Than Skin Deep: Joints of the Pectoral Girdle, Shoulder, and Upper T/S

- Thoracic vertebral extension mobility
- Posterior Glenohumeral Ligament with Redundant Fold
The Effect of Thoracic Vertebral Flexion on Shoulder Elevation—Try It

Skin contributes

Along with Muscle and Joint Changes

August 14th

August 30th
Muscles of the Pectoral Girdle
(there are many ways to group these muscles)

- **Pectoral**
  - Pec major, pec minor, coracobrachialis, short head of the biceps

- **Scapulothoracic**
  - Traps, rhomboideus, serratus anterior

- **Sternoclavicular-skelull:**
  - Costal-cervical, sternocervical
    - SCM; Scalenes, Strap muscles

- **Scapulohumeral**
  - Teres major, teres minor, long head of triceps, long head of biceps, latissimus dorsi (has an attachment to inferior angle of scapula), infraspinatus, supraspinatus, subscapularis, deltoid

- **Scapulocervical**
  - Levator scapula, rhomboid min, (omohyoid)
Flexion/Extension and Muscle Length (Action)

- [Image]

Protraction/Retraction and Muscle Length (Action)

- [Image]

Scapulothoracic/Scapulohumeral Muscles

- [Diagram]

The "Wadissimus"

- [Diagram]

- UML traps
- Deltoids
- Infraspinatus
- Latissimus
The role of the "Waddisimus" in limiting shoulder elevation, (along with latissimus shortening)

Scapulothoracic, Scapulohumeral MM
From Anterior

Subscapularis

Serratus Anterior

The Effect of Prolonged Scaption

Action: retraction to protraction
Post view
The Importance of Scapular Stabilizers

Scalenes and Breathing:  
An argument for diaphragmatic and lateral costal expansion training

Action
Note: Watch first rib elevation as scalenes pull on it with neck extension. Shortened scalenes provide the same upward pull.

Summary so Far

1. Thoracic mobility into extension from a flexed posture is necessary for full shoulder flexion
2. Shortened periscapular muscles limit shoulder elevation
   - Pectoral
     - (affects scapular alignment)
   - Scapulohumeral (anterior and posterior) and Scapulothoracic
     - By restricting distance humerus and scapula can move
3. Lack of end range shoulder elevation allows the redundant fold to adhere to itself
4. Poor breathing patterns due to pain, anxiety, posture can affect shoulder function
More than Skin Deep: Fascia

Superficial Fascia and Platysma

Deep Cervical Fascia

More than Skin Deep: Nerve Compression

- Brachial Plexus

- Radial and axillary nerves in the “waddisimus” area (triangular and quadrangular space compressions)

Brachial Plexus (green): between clavicle and first rib
Brachial Plexus: Muscular Relations

Emerges from between Anterior and Middle Scalene

And from beneath Pec Minor

Nerve Compression

Relationship of Radial and Axillary Nerves to posterior scapulo-humeral muscles (the Waddisimus)

Summary of Structural Changes Affecting Shoulder Function

1. Changes in bones and joints:
   - Upper thoracic vertebrae held flexed due to positioning
   - Muscular length changes leading to elevation of the head of the humerus in the fossa and loss of the redundant fold
   - First rib elevation that can affect shoulder function
2. Changes in muscle length:
   - Affecting scapular mechanics and position of the humeral head
   - Affecting position of the first rib
   - Possibly contributing to compression of the brachial plexus and radial and axillary nerves
Manual Therapy Breakout Session: 4 Techniques

1. Release of tight subcutaneous fascia
2. Scapulothoracic mobility testing and “wadissimus” and Subscapular release.
3. Humeral head distal and posterior glides to restore normal alignment in fossa and decrease impingement along with Mobilization with Movement
4. Upper thoracic vertebral extension

***

(Don't forget breathing training and relaxation techniques!)
References:

For a general review of the literature on scapular and rotator cuff muscle coordination, timing, strength and length contributions to arm elevation in shoulders with and without impingement:


pectoral length and scapular kinematics:


Effect of thoracic posture on scapular kinematics:

Finley MA and Lee RY. Effect of sitting posture on 3-dimensional scapular kinematics measured by skin-mounted electromyographic tracking sensors. Arch Phys Med Rehabil 2003;84 (4)


Effect of inferior capsule redundant fold adhesion on shoulder ROM:

History of the term adhesive capsulitis:


Effect of release of shoulder adhesions on shoulder ROM:

Bennett WF. Addressing Glenohumeral Stiffness While Treating the Painful and Stiff Shoulder Arthroscopically. Arthroscopy: The Journal of Arthroscopic and Related Surgery, 16(2)2000: pp 142-150
Lecture 2 (Kinesiology):
Kinematic, Kinetic, Anatomical and Physiologic Chain Concepts of the Shoulder Complex

By Murray Maitland, PhD, PT
Kinematic, kinetic, anatomical and physiologic chain concepts of the shoulder complex

Murray Maitland PhD PT
Division of Physical Therapy

A complex organ/mechanism

- The fulcrum between you and the world
- Anything that can go wrong will
- 8 muscles from the thorax to the scapula
- 14 muscles at the GH joint
- 10 nerves
- Synovial joint
- The subcutaneous and cutaneous tissue over it

Shoulder function

- Shoulder motion is correlated to QOL
- Lift your arm and have some strength to use it
- Apley’s scratch tests
- Reach both ends of the alimentary canal
- Shoulder function changes with aging
  - average flexion ROM after 75 = 112°
- Hand dominance
Impingement syndrome is common
- Defined by compression pain during elevation and horizontal adduction
- Shoulder pain in the general population is about 17% Van der Linden et al., 2005.
- 44% of 52 manual wheelchair users Finley 2004
- Only about 50% of patients show complete recovery after 6 months. Winters et al, 1999

Shoulder kinematic chain is disrupted by altered posture and constraints from:
- Burn-related contractures
- Forced inactivity
- Prolonged positions
- Pain/reflex inhibition
- Motor control
- Metabolic changes

Painful arc
Measure the symptomatic range!

Neer’s test
Variations on resisted tests in the painful range

- Empty can – full can
- O’Brien’s

Kennedy Hawkins test

- Sensitivity and Specificity issues for specific pathologies
- At least tests tell you about impairments

Impingement syndrome is merely a restatement of patient symptoms not a diagnosis

- 58 consecutive patients waiting for physical therapy because of a clinically suspected shoulder impingement syndrome Ardic et al., 2005 Am J Phys Med Rehab
- 71% had supraspinatus tear, 60% had biceps tendon findings, 44% had labral tear
Less likely

- OA, other arthropathy
- Tumor
- Chronic regional pain syndrome post-neurologic disorder
- Genetic
- Autoimmune

The Glenohumeral joint as a lever system

- The rotator cuff assists with elevation and depression of the humeral head
- The center of rotation of the GH joint stays relatively stable

Glenohumeral rhythm

- First 30° glenohumeral, 2:1 GH:ST
  - Reported TSR pre-surgery 1:2 post- 1:1
  - Pseudoparalysis
Kinematic chain

- Defined as: motion of one segment affects the motion of sequential segments
- To achieve a hand-in-space configuration many upstream orientations are possible
- The UE starts (at least) at the thoracic spine (Cathcart. J Anat Physiol, 1884)

Typical kinematic patterns

- Pelvic position
- Kyphosis of T-spine
- Forward head
- Tight lattisimus dorsi
- Pectoralis minor (anterior tilt of scapula)
- Serratus anterior

Kinetic chain

- Newton’s physical law
  - Forces are transmitted through adjacent segments, joints or whatever is there
  - E.g. Open kinetic chain/closed kinetic chain and Fall on an outstretched arm
- From your finger tips to your tippy toes
  - Mostly muscle forces associated with stability
  - Increases compression forces
Open and closed kinetic chain issues

- Important differences
- Impact has been very important
- Terrible nomenclature
  - Prefer to toss it!!
- Little demand on the shoulder musculature for the prayer and quadruped positions 6% BW (2%-10% MVIC).
- Most in one arm push up position 60% BW (40% - 80% MVIC).

More muscle force causes more joint compression force

- Lifting a coffee pot (1.5kg) with straight arm caused an average force of 105.0% BW
- 10 kg suitcase passive was a 12% BW compression load at the GH joint
- At belt height the GH compression force was 91% BW
Physiological/disease chain

- Diabetes – including rotator cuff disease, frozen shoulder
- Hypothyroid disease – polymyositis, weakness, pain
- Hyperthyroid disease – shoulder hand syndrome, frozen shoulder
- Drug side effects

Examination

- Screen for reduced range of motion using Cyriax approach
- Active motion against gravity
- Assisted to end of passive range
- Overpressure
- Most definitions of positive test
Differential diagnosis of movement impairments

- Positive tests – measure AROM, PROM
- Active-passive difference
- Arthrokinematics
- Active insufficiency = range specific muscle weakness
- Passive insufficiency

PT/OT diagnosis

- Determination of the mechanisms that give rise to the person’s health problem and the conclusions reached by doing so. (Maitland, 2010)
- Multifactorial, patient specific

Function

- The normal role of something; the mechanism by which something achieves its normal role
- Traditionally and ICF
  - Body structure and function
  - Physiology – cell – tissue – organ – system – intrinsic factors (psychological and personal factors)
  - Activity limitations and influences
  - Participation restriction and societal influences
  - Environment stressors and toxicities
Prognostic factors for shoulder pain  
Kuijpers et al., 2006

- Insidious onset
- Chronic
- Severe pain intensity
- Concomitant musculoskeletal symptoms such as LBP
- Psychological issues

Intervention strategies

- Safety, symptoms, optimize performance
- Engineer out!!
- Impairment rehabilitation is longer term
- What is the evidence for some of the usual suspects?
  - Activity modification/ergonomics
  - Exercise
  - Taping
  - Manual therapy
References for:
Murray E. Maitland
Kinematic, kinetic, anatomical and physiologic chain concepts of the shoulder complex


Cathcart CW. Movements of the shoulder girdle involved in those of the arm on the trunk. J Anat Physiol. 1884;18:211–218


Breakout Session - 1:
Soft Tissue & Joint Mobilization

By Kim Bennett, PhD, PT & Lesley Palmgren, PT, MPT
Manual Therapy For Post-burn Shoulders

Soft Tissue and Joint Techniques Breakout Session: Burn SIG
4/24/2012
Seattle, WA

Lab Instructors:

Kim Bennett PT PhD
Lesley Palmgren PT MPT
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Sarah McDonnell DPT

University of Washington
Department of Rehabilitation Medicine Programs in Physical Therapy
and
UW Medicine Regional Burn Center at Harborview
2. SCAPULAR MOBILITY

Procedures:

A. Basic Scapular Mobility:

<table>
<thead>
<tr>
<th>Position:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient sidelying involved side up (or seated). Therapist faces patient’s side, cups inferior angle of scapula with caudal (inferior if seated) hand. The thumb of the cranial (superior) hand is in patient’s axilla, fingers over top of shoulder.</td>
</tr>
</tbody>
</table>

Elevate scapula, retract scapula, depress scapula then protract making relaxed, slightly stretching circles on rib cage. Repeat 5-10 X till mobility increases, or stop if it isn’t changing.
B. To Add Stretch to the Levator Scapula:

Position:
*Patient* positioned sidelying (this will be hard to do in sitting, but could be possible), elbow of affected side bent and resting in therapist’s abdomen

*Therapist* positioned as for A

Passively retract scapula firmly, as far as possible by pressing through patient’s bent elbow and then upwardly rotate scapula using a combination of both hands and by rotating body to work through the patient’s elbow (therapist will shift their weight from caudal to cranial leg, their body following the direction of the scapula—an arc).

Note: if the scapula is not firmly retracted, this can create impingement pain between the head of the humerus and the acromion. Keep checking retraction.
C. Myofascial Release of Subscapularis, Serratus Anterior and Waddissimus

Position:
*Patient* supine, elbow of affected side bent, with hand resting on contralateral chest or in sitting hand resting on opposite shoulder for support (this can be done in sitting, but patient needs to be positioned relative to therapist so axilla is level with therapist’s hands when therapists elbows are bent 90 degrees. In this workshop, you can do this sitting facing patient’s side.)

*Therapist* sits or stands facing patient’s side.

Procedure:
With fingers of one hand pressed into the rhomboids and middle trap where they meet the medial border of the scapula, the therapist slowly inserts the fingers of the other hand between the rib cage and the anterior border of the scapula, gently meeting the resistance of tight muscles. Feel for trigger points and press into these to release.

For Waddissimus, move thumb of axillary hand down to outside margin of posterior axilla and palpate for trigger points. Thumb pressure is applied while resisting IR/ER isometrically. This can be done with patient sidelying as well, affected side up to increase pressure and make resisting IR/ER easier.

Note:
- massage cream on the hand working into serratus and subscapularis may make the procedure more comfortable
- Patients routinely will say this hurts, but not to stop as it is right where they feel some source of shoulder pain and they can feel it release. Of course if the patient does say stop, do!
- Where there has been *lymphatic damage*, this may provoke further lymphedema, and is not a helpful technique.

This can take several sessions of about 5-10 min each to fully release. Each time warm up with the scapular mobility described above.
1.

3. GLENOHUMERAL MOBILIZATION

A. Mobilization with Movement for Flexion (or Abduction)

Position:
Patient seated
Therapist standing at side and slightly behind patient and facing forward.
Anterior hand is in patient’s axilla, thumb back, fingers cupping front of humeral head. Posterior hand cups inferior angle of scapula.

Therapist applies a lateral traction force on the head of the humerus with their anterior mobilizing hand and as the patient starts to flex the shoulder, also slightly lifts the axilla to provide support for the weight of the arm. As the patient continues to flex the shoulder the therapist follows the arm upward, continuing to provide support, first with back of wrist, and as angle increases with a more distal part of their mobilizing arm. Meanwhile the posterior mobilizing hand is cupped under the inferior angle of the scapula and guides it into upward rotation.

By slightly changing orientation, the therapist can assist abduction in the same way.

Typically this is done through pain free range 5-10X with this assistance. Then the patient attempts to do the motion independently 5-10X, though the therapist may help slightly with the scapular upward rotation to assist the patient’s muscles in regaining control of this motion. 2-3 sets

B. Inferior and Posterior Glenohumeral Glides

Position:
Patient seated
Therapist standing facing patient’s side. Posterior hand angled slightly to grasp front and back of acromion and as close to the joint line as possible.
The anterior hand grasps the head of the humerus across its anterior border. Giving a slight downward distractive force it then glides the joint posteriorly either oscillating with grade I (small, gentle, relaxation glides) or up to grade III (sustained mid to end range stretch).
This may also be done supine, and the downward glide combined with the patient actively flexing or abducting the shoulder. Typically 5-10 reps of the mobs are done. Should decrease GH pain. If pain increases, check your handhold or discontinue.
4. Upper Thoracic Extension Mobilization

Lesley and Leroy Combining T/S Extension with Shoulder Flexion ROM

T 1- T3 Extension Mobilization

Position
Patient Seated, shoulders flexed as possible to 90 degrees, elbows bent 90 degrees and forarms resting on top of one another.
Therapist Standing facing patient; mobilizing arms threaded through patient arms, finger tips meeting at transverse processes of T 1-3; standing with one foot behind the other.

Procedure
Maintaining contact with transverse processes of the lower half of the motion segment, slightly lift patient’s arms with therapist arms at same time as rocking body weight from front to back leg to increase extension in upper thoracic spine. This mobilizes the upper segment over the lower one. If one side is tighter than the other, lift the contralateral patient elbow to drive the upper segment of the affected side more specifically over the lower one. Oscillate for grades I and II (early in joint range) maintain more sustained stretch at end range for grades III and IV.
Positioning & Splinting

Position of comfort = position of contracture!
Position trunk & shoulder girdle into desired end goal/outcome
Dressings can either be your friend or your enemy
  • PT/OT can play a critical role in achieving optimal positioning

Application for Shoulder ER/Abd

Position the arm in external rotation, shoulder elevation and humeral depression
Wrap kerlix for external rotation of the upper extremity
Dressings to Support Position

- Wrap kerlix to encourage chest expansion
- Kerlix roll in axilla for abductions

Dressings for Positioning

Remember to let the coflex work with you for your positioning goals!

Splints and Positioning Aides

- Splints can be your friend or your enemy!
  - Beware of nerve injuries
- Clinical relevance based on patient stage of recovery
  - Foam wedges, suspension slings
  - Airplane splints, High 5 brace
  - Kinesiotaping, positional straps
Miscellaneous Options

- Figure 8 foam strapping
- Clavicle strap
- Elastomer putty
  - 50/50 putty
- Positional Strapping

Thera-togs

- Chest expansion
- Scapular adduction/thoracic extension
- Humeral depression
- Forward head

Strapping and Postural Aides

- Improve postural control
- Carry over treatment goals
- Gentle support and reminders
Kinesiotaping

• Philosophy is to “give free range of motion in order to allow the body's muscular system to heal itself biomechanically.”
• Has the potential to impact, skin, fascia, circulatory, muscle and joint
• Can be facilitative, inhibitive, or provide mechanical correction

Resources and Information

• Kinesio Taping International Association • 3901 Georgia St. NE, Building F Suite F2 • Albuquerque, NM 87110 • 888-320-8273 • www.Kinesiotaping.Com
  • KTA Has Articles, Ideas And Upcoming Coursework And Opportunities
• Theratogs, Inc. • 305 Society Drive, Suite C-3 • Telluride, CO USA 81435-8835 (888) 634-0495 • (970) 728-7028 Fax • www.Theratogs.com • info@theratogs.com
  • Links to supporting articles available on their website
• Yoga Wrap • www.Yogawrap.com
• High Five Brace: Certified Orthopedics, Inc. • 1709 Heath Parkway • Fort Collins, CO 80524 • (800) 496-7015 • Fax: (970) 496-9529 • www.certifiedortho.com
Breakout Session - 3: Therapeutic Exercise

By Elise Carney, PT & Malvina Sher, PT
PHASE I
Yoga flow stretches to enhance

- Glenohumeral joint range of motion
- Scapulothoracic joint mobility
- Cervical-Thoracic-Lumbar spine mobility
- Diaphragmatic and accessory muscle capacity

Warm Up Stretches

Cat

Camel
Quadruped

Child’s Pose

Downward Dog
Phase II

Scapula and core stabilization

- Postural control
- Rotator cuff stabilization
- Paraspinal strengthening

Push up

Push up plus

Scaption with Thumb up
Press Up

Quadraped w/ Ball

ER with T-Band & Towel for space
Phase III

Progression of eccentric and isotonic/plyometric exercises with evidence based home exercise program
Sidelying ER with weight

Prone ER

ER with T-Band in scapular plane

Thumb up empty can (supraspinatus)
Phase III cont

Prone ER with T-Band

Prone ER with T-Band

Prone ER with a Ball
References


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Additional patents pending. © 2012 Rev. 2012-01-23