This presentation will teach you how to do the scapular dyskinesis test.

You can view this via your internet browser or save to your desktop. We recommend saving to your desktop for easiest access.

Navigate the PPT by clicking on the blue highlighted words.
  - By clicking this word it will take you to the described portion of the PPT

Techniques for which there is a video available are indicated by ** beside the picture.

To view a video clip, click your computer mouse on the picture – the video will run once
  - You will not be able to stop the video but can view the clip as many times as you need to
Dynamic Scapular Motion Assessment

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Purpose - train PTs/ATCs to visually identify scapular dysfunction. This tutorial will...

- Describe normal & abnormal scapular mechanics from a 3-D perspective
- Provide video examples of normal & abnormal scapular movement
- Describe the use of a scapular assessment system based on visual analysis
- End with a self-assessment to document proficiency
How to view examples...

- This presentation contains pictures and video footage of subjects with and without scapular dysfunction – each will be labeled.
- View this presentation in **Slide Show** mode.
- To **view** a video clip, click your computer mouse on the picture – the video will run once.
- You can stop the clip part way through its run by single clicking on the picture and restart the clip with another single click.
- You can view the clip as many times as you need to.
Practice Viewing Clips

- Do not proceed with this presentation until you are able to view this video

- Practice stopping the video at points of interest so that later in the presentation you can study scapular abnormalities

**VIDEO:** Watch one of the authors jump into Lake George! Click to view. The circle will disappear once the video clip begins.
Normal Scapular Motion
Normal or abnormal scapular motion has been traditionally assessed by comparing scapular motion to "normal" scapulohumeral rhythm of $1^\circ$ of upward rotation of the scapula for each $2^\circ$ of humeral elevation.
Limitations...

This traditional approach is inadequate because:

- Only one basic rotation of the scapula is considered
- Normal scapular motion involves 3 rotations, and
- Scapular dysfunction may occur in any of these 3 rotations
Scapular motion is more than upward rotation...

Three-dimensional analysis of the scapula has shown 3 distinct but coordinated scapula rotations about different axes during arm elevation...

- **Upward/Downward Rotation**
- **Anterior/Posterior Tilt**
- **External/Internal Rotation**
Normal Up/Downward Rotation

- Scapular motion about an axis perpendicular to the plane of the scapula is known as upward/downward rotation.

- Upward rotation tilts the glenoid fossa superiorly during arm elevation and begins during the first 30° to 60° of arm elevation.

**Picture:** Scapula at rest and in upward rotation

**Video:** Scapular rotation (click to view)
Observing Normal Upward Rotation During Arm Elevation...

Raising:
From 0° → 30° of elevation
- The scapula should move very little

From 30° → Max Elevation
- The medial scapular border demonstrates smooth upward rotation
- The entire scapula elevates; this is slightly more pronounced at end range

Lowering:
From Max Elevation → 0°
- The scapula smoothly and continuously returns to resting position

VIDEO: Normal Upward Rotation during arm elevation (click to view)
Normal Scapular Tilt

- Scapular motion around an axis roughly through the spine of the scapula is called posterior or anterior tilt (named by the movement of the superior border).

- During arm elevation the normal scapula moves into posterior tilting and lies flat against the thorax.
Normal External Rotation

- Scapular motion about a roughly vertical axis is known as internal or external rotation.

- The scapula normally externally rotates (lateral border moves posterior) during arm elevation, particularly above 90°
Observing Normal Scapular Tilt & External/Internal Rotation

During normal arm elevation, the scapula lies relatively flat against the thorax:

- generally, expect <\(\frac{1}{2}\)" protrusion of both the medial border and the inferior angle of the scapula off of the thorax
- The skin between the scapula and thorax is taut.

**VIDEO**: Posterior view of the normal scapular borders

**VIDEO**: Superior view of the normal scapula
Normal scapular motion is therefore...

A smoothly coordinated combination of:

- upward rotation, posterior tilt, external rotation during full arm elevation and a reversal of these movements during arm lowering.

**VIDEO**: Normal scapular motion during humeral elevation, click to view
Abnormal Scapular Motion (Dyskinesis)
Scapular Dyskinesis

- “An observable alteration in scapula position and motion pattern relative to the thorax”
  - Kibler 2003
- Currently, no standard terminology or system for identifying scapular dyskinesis clinically

**Note:** Don’t just look for asymmetry. This subject is abnormal bilaterally, which is common.

**VIDEO:** Example of bilateral scapular dyskinesis (click to view)
Scapular Dyskinesis

- Two Primary Sub-Types
  - “Winging”*
  - Dysrhythmia

- Relationship to pathology
  - Often associated with glenohumeral pathology
  - May or may not be associated with nerve injury
  - May be asymptomatic
  - May predispose to pathology
  - Cause or Effect? (chicken or egg debate)

*NOTE: the term “winging” has traditionally been associated with nerve injury. In this system it merely describes an abnormal prominence of the medial border and/or inferior angle of the scapula.
Dyskinesia: Winging

Winging occurs when the scapula’s medial border and/or inferior angle moves away from the posterior thorax, **becoming more prominent** during arm motion and a sulcus/gap is created between the scapula and the thorax:
- ≥1” is considered abnormal
- May be unilateral or bilateral (as seen in these pictures)
Observing “Winging”...

- Look for protrusion of the inferior angle, best seen from the posterior view
  - Look for a “striking” or obvious prominence & a sulcus/gap between the inferior scapula and the thorax
- Look for a “striking” protrusion of the medial border, seen here from the superior view
  - Look for distinct prominence and a sulcus $\geq 1”$ of the border above the thorax

VIDEO: Posterior view of winging (click)

VIDEO: Superior view of winging (click)
Here’s an example of: “Obvious” (O) on the left, and a “Subtle” (S) on the right during flexion. (* most evident from about 30° to 90°)

**VIDEO:** Posterior view of flexion (click)

**Picture:** Posterior view of “obvious” winging on the left and “subtle” winging on the right.

**Picture:** Superior view of “obvious” winging on the left and “subtle” winging on the right.
Here’s an example of:

“Subtle” (S) on the left and right during abduction.

It was judged as an “S” because it was not a “striking” abnormality yet there was an element of winging.

**VIDEO**: Posterior view of abduction (click)

**Picture**: Posterior view of “subtle” winging on the left and right during abduction
Summary – Scapular Position Relative to Thorax during Elevation

**Normal**

During arm elevation...
- Medial border relatively flat
- Inferior angle relatively flat
- $<\frac{1}{2}$” protrusion

**Abnormal (Winging)**

During arm elevation...
- Medial border protrudes or
- Inferior angle protrudes
- Generally $\geq 1$” sulcus/gap
- Protrusion should be “striking”

**VIDEO:** Normal scapula, superior view, click to view
Hint: Try to stop each video at 60 deg arm elevation

**VIDEO:** Winging scapula, superior view, click to view
Dyskinesis: Dysrhythmia

Describes a lack of “smooth” scapulohumeral rhythm

- A “hitch or a jump in the otherwise smooth motion.” (Kibler, 2003)
- Most common pattern is early/excessive scapular elevation (shrug)
- Another common pattern: rapid downward rotation during lowering (dump)
- Best seen from a posterior view

*Picture:* Example of “shrug” during arm raising

*Picture:* “Dumping” on Left during arm lowering
Observing Dysrhythmias During Shoulder Elevation (Ascending Phase)

Focus specifically on:
- the soft-tissue contour between the head and shoulder to detect excess scapular elevation (shrug)
- the angle of the medial border to detect early and excessive upward rotation

VIDEO: Scapular dysrhythmia on right side (click to view)
Observing Dysrhythmias During Shoulder Elevation (Descending Phase)

Focus specifically on:

- the inferior angle of the scapula during descent from $90^\circ \rightarrow 0^\circ$
  
  - Note in this example that ascent is normal

- Rate of descent should be relatively constant

- Inferior angle should not pass its original resting position

VIDEO: Example of scapular dysrhythmia (dumping) on the left side during lowering; click to view
Summary Scapulohumeral Rhythm

Normal
- Upward rotation of the scapula begins after 30° of arm elevation
- Movement is smooth & consistent

VIDEO: Normal scapular rhythm (click to view)

Dysrhythmia
- Upward rotation before 30° during elevation
- Excess upward rotation (shrug)
- Downward rotation below 90° is uncontrolled/rapid on descent

VIDEO: Scapular dysrhythmia (click to view)
Common “Gray Areas”...

- Winging and dysrhythmia often occur together: **either** constitutes dyskinesis
- Observe both raising AND lowering, as dyskinesis may be more common in the lowering phase, especially below 90°
- Less apparent in obese individuals, common for to visualize scapular borders on very thin individuals
- **Don’t focus on symmetry**, it is common to have abnormal motion bilaterally
Common “Gray Areas”...

Evaluate left & right scapula independently

- Common to see abnormal motion bilaterally
- Therefore, possible to have symmetry but still have abnormal motion

VIDEO: Example of bilateral dyskinesis (click to view)
Common “Gray Areas”...

Resting Posture & Dynamic Motion

- Resting posture often shows “winging” or downward rotation
- The issue is **not** the position at rest but what happens during motion
- Therefore:
  - Subjects who “wing” at rest AND wing during motion are judged to be abnormal
  - Subjects who “wing” at rest but DO **NOT** wing during motion are judged to be normal
Common “Gray Areas”...

- Visual assessment requires judgment;
- Not everything is obviously normal or abnormal. Therefore...

- Our rating system allows 3 descriptors:
  - Normal – no evidence of abnormality
  - Subtle – mild or questionable evidence of abnormality, not consistently present
  - Obvious – striking, clearly apparent abnormalities, evident on multiple trials
Scapular Assessment System
Classifying Scapular Motion

- Subjects perform:
  - 2 test motions
  - 5 reps of each
- View each video
- Rate scapular motion on each test as:
  - Normal (N) – no evidence of abnormality
  - Subtle (S) – mild or questionable evidence of abnormality, not consistently present
  - Obvious (O) – striking, clearly apparent abnormalities, evident on at least 3/5 trials
  - dysrhythmia or
  - winging of 1” or greater

Subjects may be viewed multiple times
Test Movements

Subjects perform the following test movements:

- **Flexion vs 3 or 5lbs (5 reps)**
- **Abduction vs 3 or 5lbs (5 reps)**

Note: other movements may be added if relevant to a particular patient or activity.
Flexion

- Notice the difference in prominence of the scapular inferior angle on these subjects during flexion.
- The subject on the right exhibits obvious winging while the subject on the left has normal motion.

VIDEO: Normal vs Abnormal Flexion (click to view)

VIDEO: Superior view of subject on right
Abduction

- Again notice the difference in prominence of the scapular inferior angle on these subjects during abduction.
- For the subject on the right, in addition to the obvious **winging**, note the increased rate of scapular downward rotation as the arm is descending from 90° to 0° (subtle dysrhythmia).

**VIDEO**: Normal vs Abnormal Abduction; note winging and dysrhythmia

**VIDEO**: Subject on right, note winging
Assess the Subjects (Form)

- Print your name in the top box next to Rater
- Print the subject’s ID#
- Observe each task & rate the left and right scapula independently. Assign a:
  - **O** if you observe *obvious* abnormalities on ≥2/5 reps
  - **S** if you observe *subtle* abnormalities on ≥2/5 reps
  - **N** if you consider motion *normal*

For example:

<table>
<thead>
<tr>
<th>Rater:</th>
<th>Joe Blow</th>
</tr>
</thead>
<tbody>
<tr>
<td>ID #:</td>
<td>17</td>
</tr>
<tr>
<td>Task</td>
<td>Left</td>
</tr>
<tr>
<td>Flexion</td>
<td>S</td>
</tr>
<tr>
<td>Abd</td>
<td>O</td>
</tr>
</tbody>
</table>
Self-Assessment

It is now time to check your proficiency at assessing scapular motion...

Rate both the left and right scapula for each subject:

N = Normal
S = Subtle Abnormality (Mild, questionable or inconsistent)
O = Obvious Abnormality (Striking, clear, consistent)

Remember, winging or dysrhythmia must be “striking” and present on multiple trials to warrant an “O” rating!
Subject 1 Performing Abduction

- Watch the video and make your assessment
- Rate this subject’s left and right scapula as N, S, or O
- The answer is on the next slide
Subject 1 Performing Abduction

- Both Left & Right scapula should be rated as:

N = NORMAL
Subject 2 Performing Flexion

- Watch the video and make your assessment
- Rate this subject’s left and right scapula as N, S, or O
- The answer is on the next slide
Subject 2 Performing Flexion

- Both Left & Right scapula should be rated as:
  
  **O = Obvious Abnormality**
  
- Note winging on both scapulae and mild dysrhythmia on the Left (reps 2, 4, 5)
Before moving on...

To assess patients/clients:

- Make sure you thoroughly understand the material and have answered all the self-assessment questions correctly.

- If you *did not answer all questions correctly*, review the materials again & ask questions. Then proceed to Self-Assessment II following the Thank You slide.
Thank you...

For your time in watching this presentation.

If you have any questions, please contact:
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Or
Angela Tate MS, PT: angelartate@comcast.com

Remember, the visual scapular assessment system is only one component of a comprehensive shoulder examination and should be used in conjunction with other relevant tests and measures in evaluating any patients or clients.
Self-Assessment II

Again, check your proficiency at assessing scapular motion...

Rate both the left and right scapula for each subject:

N = Normal
S = Subtle Abnormality (Mild, questionable or inconsistent)
O = Obvious Abnormality (Striking, clear, consistent)

Remember, winging or dysrhythmia must be present on multiple trials to warrant an “O” rating!
Subject 4 Performing Abduction

- Watch the video and make your assessment
- Rate this subject’s left and right scapula as N, S, or O
- The answer is on the next slide
Subject 4 Performing Abduction

- Both Left & Right scapula should be rated as:
  
  **O = Obvious Abnormality**

- Note bilateral winging and a mild left-sided dysrhythmia (on arm descent)
Subject 5 Performing Abduction

- Watch the video and make your assessment
- Rate this subject’s left and right scapula as N, S, or O
- The answer is on the next slide
Subject 5 Performing Abduction

- Rate the Right scapula as: **N = Normal**
- Rate the Left scapula as: **O = Obvious Abnormality**
Subject 6 Performing Abduction

- Watch the video and make your assessment
- Rate this subject’s left and right scapula as N, S, or O
- The answer is on the next slide
Subject 6 Performing Abduction

- Both Left & Right scapula should be rated as: N = Normal