What is Laxity, Ehlers- Danlos and Multidirectional Instability and How We can make the Diagnosis?

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A. Laxity vs. Instability

1. laxity = glenohumeral translation (an examination finding)
2. instability = symptomatic glenohumeral translation with function
3. many patients likely have unidirectional instability with multidirectional laxity

B. Hyperlaxity

1. Congenital
   a) Ehlers-Danlos
   b) Marfans
   c) osteogenesis imperfect
   d) benign hypermobility syndrome

2. Acquired
   a) repetitive microtrauma
   b) athletics
   c) aggressive, repetitive stretching
   d) repetitive microtrauma

C. Multidirectional Shoulder Instability

1. definition
   a) Neer and Foster – “symptomatic, involuntary instability in more than 1 direction”
      - usually an inferior component
   b) arguable if truly MDI when inferior “instability” is only detected with a painful sulcus sign on examination
   c) the presence of excessive inferior laxity and a positive sulcus sign in the absence of significant symptoms does not constitute MDI

2. pathology
   a) capsule
      - thin, hyperelastic, patulous
      - greater density of elastin
      - collagen may be pathologic, ie Ehlers-Danlos, or Marfan’
      - acquired strain
      - may develop painful secondary capsulitis
      - HAGL / RHAGL
      - midcapsular rent
   b) rotator interval
- may be enlarged, difficult to quantitate dimensions
- association with MDI is clear, specific relationship harder to define

c) labrum
- usually hypotrophic (thin, flattened)
- fissured / cracked: likely due to repeated translation of humeral head over glenoid rim

d) proprioception deficits (neuromuscular control)
- loss of proprioceptive feedback, especially arm / shoulder position in space
- slower cuff and deltoid activation with overhead activities / throwing
- deltoid and cuff muscle activity may be abbreviated
- fatigue → decreased proprioception / neuromuscular control
  → increased translational laxity → increased pain / instability

e) rotator cuff
- may develop rotator cuff tendonitis due to “overstretch” or “overstress” in attempts to compensate for / control increased translation

f) scapular dyskinesia
- less scapular abduction with overhead activities in MDI patients
- unstable, tilted base for flexed / abducted humeral head
- scapula tends to be protracted – loss of posterior stability

3. History
  a) insidious onset
  b) macrotrauma unlikely
  c) recurrent subluxation >> dislocation
  d) sense of looseness vs only pain
  e) Sx with overhead activities frequent
  f) may be voluntary

3. Shoulder Examination
  a) hyper-ROM
     - flexion > 180°
     - external rotation > 80° in adduction
  b) translation on “load and shift” is greater than 50%
  c) apprehension possible; much less likely than unidirectional instability
  d) sulcus sign
     - > 1 cm acromiohumeral space
     - correction in 30° ER ? suggestive of competent CHL
  e) Gagey hyperabduction sign: > 105°
4. Hyperlaxity Examination (+ in 40 – 70% of MDI patients)
   a) generalized hyperlaxity: Beighton criteria:
      1) passive dorsiflexion of 5th MCP > 90°
      2) passive thumb opposition to the forearm
      3) active elbow hyperextension > 10°
      4) active knee hyperextension > 10°
      5) forward trunk flexion to permit the palms of the hands to rest flat on the floor with the knees fully extended
   b) scoring
      - each item scored bilaterally except trunk flexion (range 0 – 9)
      - not a firm cut-off for hyperlaxity; some use > 4 and some use > 6
      - if hyperlaxity according to Beighton criteria -> 2.5 X increase in shoulder instability

References


