

The Landing Error Score System (LESS)

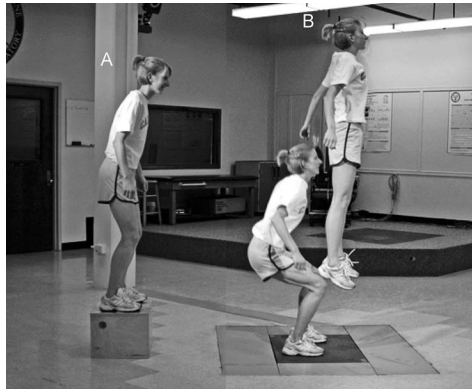


Figure 1. The subject jumps from the box to the landing area, then immediately jumps for maximal height. From Padua et al (2015).<sup>44</sup>

Landing Error Scoring System Item	Operational Definition of Error	Scoring
Knee flexion: initial contact	The knee is flexed less than 30° at initial contact.	0 = Absent 1 = Present
Hip flexion: initial contact	The thigh is in line with the trunk at initial contact.	0 = Absent 1 = Present
Trunk flexion: initial contact	The trunk is vertical or extended on the hips at initial contact.	0 = Absent 1 = Present
Ankle-plantar flexion: initial contact	The foot lands heel to toe or with a flat foot at initial contact.	0 = Absent 1 = Present
Medial knee position: initial contact	The center of the patella is medial to the midfoot at initial contact.	0 = Absent 1 = Present
Lateral-trunk flexion: initial contact	The midline of the trunk is flexed to the left or the right side of the body at initial contact.	0 = Absent 1 = Present
Stance width: wide	The feet are positioned greater than a shoulder width apart (acromion processes) at initial contact.	0 = Absent 1 = Present
Stance width: narrow	The feet are positioned less than a shoulder width apart (acromion processes) at initial contact.	0 = Absent 1 = Present
Foot position: external rotation	The foot is internally rotated more than 30° between initial contact and maximum knee flexion.	0 = Absent 1 = Present
Foot position: internal rotation	The foot is externally rotated more than 30° between initial contact and maximum knee flexion.	0 = Absent 1 = Present
Symmetric initial foot contact: initial contact	One foot lands before the other foot or 1 foot lands heel to toe and the other foot lands toe to heel.	0 = Absent 1 = Present
Knee-flexion displacement	The knee flexes less than 45° between initial contact and maximum knee flexion.	0 = Absent 1 = Present
Hip-flexion displacement	The thigh does not flex more on the trunk between initial contact and maximum knee flexion.	0 = Absent 1 = Present
Trunk-flexion displacement	The trunk does not flex more between initial contact and maximum knee flexion.	0 = Absent 1 = Present
Medial-knee displacement	At the point of maximum medial knee position, the center of the patella is medial to the midfoot.	0 = Absent 1 = Present
Joint displacement	Soft: the participant demonstrates a large amount of trunk, hip, and knee displacement. Average: the participant has some, but not a large amount of, trunk, hip, and knee displacement.	0 = Soft 1 = Average
Overall impression	Stiff: the participant goes through very little, if any, trunk, hip, and knee displacement. Excellent: the participant displays a soft landing with no frontal-plane or transverse-plane motion. Poor: the participant displays large frontal-plane or transverse-plane motion, or the participant displays a stiff landing with some frontal-plane or transverse-plane motion. Average: all other landings.	2 = Stiff 0 = Excellent 1 = Average 2 = Poor

Table 1. LESS scoring items and definitions. From Padua et al (2015).<sup>44</sup>

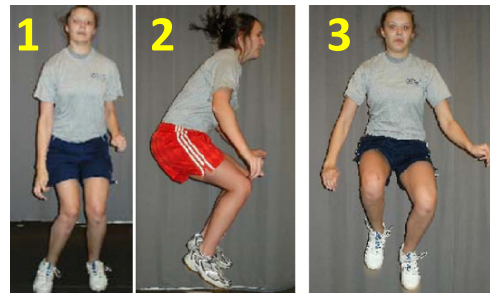
## The Tuck Jump Assessment



Figure 2. Demonstration of a tuck jump. From Myer et al (2008).<sup>47</sup>

### Knee & Thigh Motion

1. Knee valgus on landing
  - Hip, knee and foot aligned, no collapse of the knee inwards
2. Thighs not reaching parallel (peak of jump)
3. Thighs not equal side to side (during flight)



### Foot position during landing

4. Foot placement not shoulder width apart
  - Inside of tape marks
5. Foot placement not parallel (front to back)
6. Foot contact timing not equal
  - Asymmetrical landing
7. Does not land in same foot print
  - Consistent point of landing
8. Excessive landing contact noise



### Plyometric technique

9. Pause between jumps
10. Technique declines prior to 10seconds

Figure 3. Criteria for the Tuck Jump Assessment and pictures show faulty movement patterns. From Herrington et al (2013).<sup>34</sup>