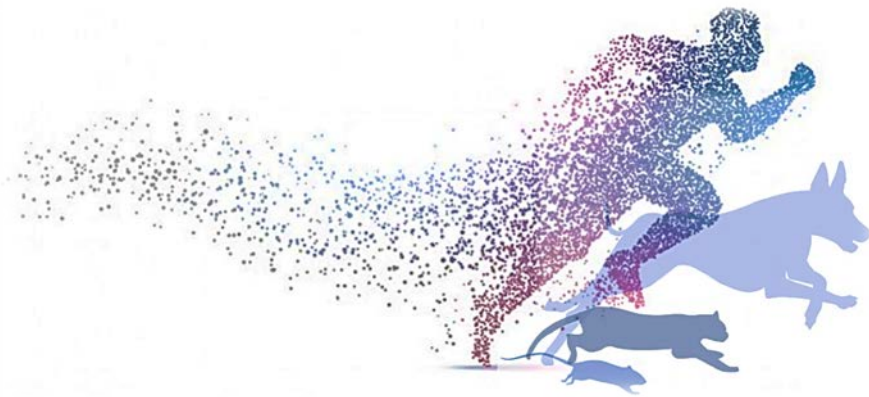


NC State Translational Research in Pain (TRiP) Feline Musculoskeletal Pain, Muscle Atrophy and Sensitivity Scoring Systems



Joint Evaluation Scoring

R Forelimb		Pain (0-4)	Crepitus (0-2)	Effusion (0-2)	Thickening (0-2)
Feet					
Carpus					
Elbow					
Shoulder					
R Hindlimb		Pain (0-4)	Crepitus (0-2)	Effusion (0-2)	Thickening (0-2)
Feet					
Hock					
Stifle					
Hip					
L Forelimb		Pain (0-4)	Crepitus (0-2)	Effusion (0-2)	Thickening (0-2)
Feet					
Carpus					
Elbow					
Shoulder					
L Hindlimb		Pain (0-4)	Crepitus (0-2)	Effusion (0-2)	Thickening (0-2)
Feet					
Hock					
Stifle					
Hip					
Spinal Column		Pain (0-4)			
Cervical					
Thoracic					
T-L					
Lumbar					
L-S					

Key

Pain scale based on palpation (used in [1] and subsequent clinical studies)

- 0 **No resentment**; normal amount of movement or wriggling
- 1 **Mild withdrawal**; mildly resists
- 2 **Moderate withdrawal**; body tenses; **may orient** to site; **may vocalize** / increase in vocalization
- 3 **Orients to site**; **forcible withdrawal** from manipulation; may vocalize or hiss or bite
- 4 **Tries to escape / prevent manipulation**; **bite/hiss**; marked guarding of area

Crepitus, Effusion, Thickening: none (0); slight-moderate (1); significant-severe (2) (used in [1] and subsequent clinical studies)

Overall Limbal Muscle Mass (Atrophy) and Sensitivity Scoring

	Fore-Quarters	Hind-Quarters
SENSITIVITY		
MUSCLE MASS		

SENSITIVITY scale based on palpation

- 0 **No resentment**; area not sensitive
- 1 **Twitching of skin**; Mild moving of body part away with moderate to firm touch; **No fasciculation of muscles**
- 2 **Obvious moving of body part away with moderate to firm touch**; may orient to site; may vocalize / increase in vocalization; **Detectable fasciculation of muscles, may be only on first assessment**
- 3 **Withdraws from slight touch**; may vocalize or hiss or bite; **Repeatable fasciculation of muscles**
- 4 **Tries to escape / prevent are being touched**; bite/hiss; marked guarding of area; **Repeatable fasciculation of muscles**

MUSCLE MASS assessment scale (adapted from [2] #)

- 0 **Normal**
- 1 **Mild decrease in muscle mass**
- 2 **Moderate decrease in muscle mass**
- 3 **Severe decrease in muscle mass**

Detailed Muscle Mass (Atrophy) Scoring

Muscles	R Forelimb	L Forelimb	Muscles	R Hindlimb	L Hindlimb
Supraspinatus			Gluteals		
Infraspinatus			Semimembranous/ Semitendinous/ Biceps femoris		
Triceps Brachii					
Biceps Brachii			Quadriceps Femoris		
Antebrachium			Crus		

Muscle Atrophy Score *(Note: Adapted from [2])*

- 0: None, normal, symmetric with opposite limb
- 1: mild muscle loss felt on palpation
- 2: moderate muscle loss is felt and slightly visible
- 3: severe, muscle loss is visible can palpate one or underlying muscles

Notes

The muscle mass scoring system in [2] was based on a 0-3 scale, but it involved assessment of muscle mass over several parts of the body, and 0 was 'severely atrophied'. The suggested scale has been adapted so that higher scores indicate more atrophy, and it applies to an overall assessment of muscle of the forequarters or hind quarters

\$ The muscle mass scoring system in [2] was based on a 0-3 scale, but it involved assessment of muscle mass over several parts of the body, and 0 was 'severely atrophied'. The suggested scale has been adapted so that higher scores indicate more atrophy, and it applies to an assessment of individual muscles or muscle collections.

References

1. Lascelles, B.D., et al., *Relationship of orthopedic examination, goniometric measurements, and radiographic signs of degenerative joint disease in cats*. BMC Vet Res, 2012. **8**: p. 10.
2. Michel, K.E., et al., *Correlation of a feline muscle mass score with body composition determined by dual-energy X-ray absorptiometry*. Br J Nutr, 2011. **106 Suppl 1**: p. S57-9.