Clinical EBP Example Application

1. **Title:** Treating the Thoracic Spine: An Evidence-Based Approach

2. **NATA Practice Domains:** Domain II Clinical Evaluation and Diagnosis; Domain IV Treatment and Rehabilitation

3. **Difficulty Level:** Essential, Advanced or Mastery
   Advanced

4. **Learning Objectives: (Must be written with Bloom's Taxonomy)**
   In this learning lab, attendees will:
   1) Outline the importance of thoracic spine mobility and relate how a lack of motion can affect function throughout the spine and upper kinetic chain.
   2) Analyze thoracic spine mobility and classify differences in spinal versus segmental motion loss to determine a therapeutic intervention.
   3) Apply static and dynamic thoracic spine joint mobilizations to improve range of motion.
   4) Build a therapeutic exercise program to maximize the manual therapy intervention.

5. Primary Clinical Question(s):

   Clinical Question #1: Is gross spinal motion analysis or segmental spinal motion analysis a more accurate measure to identify mobility deficits in active adults with pain?

P	Active adults
I	Gross Spinal Motion OR Spine Goniometry
C	Segmental Spinal Motion OR PIVM
O	Loss of motion OR Decreased mobility

   Clinical Question #2: In patients who lack thoracic spine mobility, are manual therapy mobilizations, alone, as effective as manual therapy mobilizations in combination with soft tissue stretching for improving patient function?

P	Active adults
I	Joint Mobilization
C	Joint Mobilization with Stretching
O	Improved function OR Improved mobility

6. Identify the Educational Need and Practice Gap: Explain the overall educational need for this program and identify one specific practice gap. What is the gap between available evidence and current clinical practice? There may be gaps in knowledge, competency and/or performance. Why is it important to close this gap? Use citations where appropriate to support your position.

Lack of thoracic spine motion has been identified as a risk factor for injury locally[1-3] and regionally[1,4,5] in the body. Unfortunately, many athletic trainers report being uncomfortable assessing or treating the thoracic spine, possibly due to the low prevalence of acute injury to the thoracic spine.[6,7] While the risk of acute injury in the thoracic spine region is low, authors have started to build a case for regional interdependence in the thoracic spine. According to the regional interdependence theory, one body segment influences the function of other body segments periphery. Lack of mobility in the thoracic spine has been demonstrated to have an influence specifically lumbar spine,[1-3,8] cervical spine,[1,4,5,8] and shoulder[1,4,8,9] As evidence builds on the role and implications thoracic spine mobility plays on area body regions, it is becoming more important for athletic trainers to be able to correctly assess and treat this impairment.

Currently, clinicians are trained to measure thoracic spine range of motion (ROM) globally using direct measures such as a goniometer[10-12] or tape measure[10] and/or indirect measures such as posture[12,13] and movement analysis.[14] It has been found that these measures do not accurately reflect true spinal mobility.[15,16] Other methods of assessment, including skilled passive intervertebral movement (PIVM) assessment may be able to give a more complete assessment of true thoracic spinal motion.[17-20] Typically athletic trainers are not taught how to perform PIVM assessments and may be missing some critical data points in their mobility evaluation of the thoracic spinal region.

To treat mobility limitations in the thoracic spine, clinicians need to have multiple rehabilitation techniques available to use. Traditionally, soft tissue stretching has been a treatment focus and while little attention has been paid to restoration of joint segmental mobility.[1,8,9,14,20] To best address limitations in spine mobility, a combination of soft tissue stretching and segmental joint mobilization should be used. Evidence has demonstrated that the addition of segmental mobilizations can help improve thoracic spine mobility and overall function restoring normal regional interdependence.[21-27]

In this educational session, athletic trainers will learn different spinal mobility assessment methods and treatment techniques along with the evidence that supports or refute each. Participants will have the opportunity to practice and refine these techniques during the learning lab format.

7. List of at least 3 peer reviewed references with current evidence addressing your primary question(s).

1. Cook C. Orthopedic Manual Therapy: An Evidence Based Approach. Prentice Hall: 2012.
2. Goshtigian GR, Swanson BT. Using the Selective Functional Movement Assessment and Regional Interdependence Theory to Guide Treatment of an Athlete with Back Pain: A Case Report. Int J Sports Phys Ther. 2016 Aug;11(4):575-95.
3. Sawacha Z, Carraro E, Del Din S, Guiotto A, Bonaldo L, Punzi L, Cobelli C, Masiero S. Biomechanical assessment of balance and posture in subjects with ankylosing spondylitis. J Neuroeng Rehabil. 2012 Aug 29;9:63.
   Additional References used above:
4. Norlander S, Gustavsson BA, Lindell J, Nordgren B. Reduced mobility in the cervico-thoracic motion segment--a risk factor for musculoskeletal neck-shoulder pain: a two-year prospective follow-up study. Scand J Rehabil Med. 1997 Sep;29(3):167-74.
5. Heneghan NR, Smith R, Rushton A. Thoracic dysfunction in whiplash-associated disorders: a systematic review and meta-analysis protocol. Syst Rev. 2016 Feb 9;5:26.
6. Wirth B, Knecht C, Humphreys K. Spine Day 2012: spinal pain in Swiss school children- epidemiology and risk factors. BMC Pediatr. 2013 Oct 5;13:159.
7. Malina RM, Morano PJ, Barron M, Miller SJ, Cumming SP, Kontos AP. Incidence and player risk factors for injury in youth football. Clin J Sport Med. 2006 May;16(3):214-22.
8. McDevitt A, Young J, Mintken P, Cleland J. Regional interdependence and manual therapy directed at the thoracic spine. J Man Manip Ther. 2015 Jul;23(3):139-46.
9. Heneghan NR, Rushton A. Understanding why the thoracic region is the 'Cinderella' region of the spine. Man Ther. 2016 Feb;21:274-6.
10. Norkin CC, White DJ. Measurement of Joint Motion: A Guide to Goniometry. 4th Ed. FA Davis, Philadelphia, PA: 2009.
11. Cidem M, Karacan I, Uludag M. Normal range of spinal mobility for healthy young adult Turkish men. Rheumatol Int. 2012 Aug;32(8):2265-9.
12. Prentice WE. *Principles of Athletic Training: A Competency-Based Approach.* 14th ed. New York, NY: McGraw-Hill; 2011.
13. Johnson J. Postural Assessment. Human Kinetics, Champaign, IL: 2012.
14. Cook G. *Movement: Functional Movement Systems – Screening, Assessment, Corrective Strategies.* Aptos, CA: On Target Publications; 2010.

15. Castro MP, Stebbings SM, Milosavljevic S, Bussey MD. Criterion-concurrent validity of spinal mobility tests in ankylosing spondylitis: a systematic review of the literature. J Rheumatol. 2015 Feb;42(2):243-51.
16. Castro MP, Stebbings SM, Milosavljevic S, Bussey MD. Construct validity of clinical spinal mobility tests in ankylosing spondylitis: a systematic review and meta-analysis. Clin Rheumatol. 2016 Jul;35(7):1777-87.
17. Cook and Hegedus. Orthopedic Clinical Examination Tests: An Evidence Based Approach. Prentice Hall. 2013.
18. Fiebert IM, Spyropoulos T, Peterman D, Dotson L. Thoracic segmental flexion during cervical forward bending. J Back Musculoskelet Rehabil. 1993 Jan 1;3(4):80-5.
19. Manning DM, Dedrick GS, Sizer PS, Brismée JM. Reliability of a seated three-dimensional passive intervertebral motion test for mobility, end-feel, and pain provocation in patients with cervicalgia. J Man Manip Ther. 2012 Aug;20(3):135-41.
20. Johnson KD, Grindstaff TL. Thoracic region self-mobilization: a clinical suggestion. Int J Sports Phys Ther. 2012 Apr;7(2):252-6.
21. Widberg K, Karimi H, Hafström I. Self- and manual mobilization improves spine mobility in men with ankylosing spondylitis--a randomized study. Clin Rehabil. 2009 Jul;23(7):599-608.
22. Kessler TJ, Brunner F, Künzer S, Crippa M, Kissling R. [Effects of Maitland's manual mobilization on the thoracic spine]. Rehabilitation (Stuttg). 2005 Dec;44(6):361-6. German.
23. Edmondston SJ, Singer KP. Thoracic spine: anatomical and biomechanical considerations for manual therapy. Man Ther. 1997 Aug;2(3):132-143.
24. Yang SR, Kim K, Park SJ, Kim K. The effect of thoracic spine mobilization and stabilization exercise on the muscular strength and flexibility of the trunk of chronic low back pain patients. J Phys Ther Sci. 2015 Dec;27(12):3851-4.
25. McGregor C, Boyles R, Murahashi L, Sena T, Yarnall R. The immediate effects of thoracic transverse mobilization in patients with the primary complaint of mechanical neck pain: a pilot study. J Man Manip Ther. 2014 Nov;22(4):191-8.
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27. van Trijffel E, Oostendorp RA, Lindeboom R, Bossuyt PM, Lucas C. Perceptions and use of passive intervertebral motion assessment of the spine: a survey among physiotherapists specializing in manual therapy. Man Ther. 2009 Jun;14(3):243-51.

8. Clinical Bottom Line: With the understanding that this program is still in development, it is anticipated that the author is well versed on this topic. Please provide a clinical bottom line that succinctly answers the primary clinical question. This likely includes recommendation(s) for clinical practice. The focus should be on improving patient outcomes or decreasing patient burden. This is not a summary of the program, but rather a summary of the evidence or the final take-away. It should provide a recommendation as to what ATs could be doing to improve patient outcomes. This could include potential barriers to implementing the clinical recommendation.

   The use of traditional goniometric measurements to assess thoracic spine range of motion provides an incomplete picture of spinal mobility. Athletic trainers should also add passive intervertebral motion assessments to assess segmental mobility to identify local areas of mobility loss. The addition of focused joint mobilizations to the thoracic spine, in combination with a therapeutic exercise program, have proven to be superior to exercise alone. These treatment techniques can easily be learned and integrated into clinical practice once refined by the clinician.

9. Please provide the learning methods utilized in this program. Educational methods should be appropriate for the program's objectives, pedagogy and facilities as well as the intended audience's skill level.

   The program will consist of a 1-hour lecture and 1-hour lab that will incorporate a wide variety of real-life cases, research and clinical findings related to thoracic spine mobility. Each mobility assessment and mobilization technique will be covered in-depth with a summary of published evidence. Assessments and techniques supported in the literature will be practiced by the audience during the lab portion of the session. The audience will have the opportunity to interact and pose questions throughout the presentation following the assessment section and treatment section.

10. List all known instructors and their credentials:
    Dr. Scott Lawrance, DHSc, LAT, ATC