The relationship between body positioning, muscle activity, and spinal kinematics in cyclists with and without low back pain

Gabriel Streisfeld, SPT
Department of Physical Therapy, Thomas Jefferson University, gabriel.streisfeld@jefferson.edu

Caitlin E. Bartoszek, SPT
Department of Physical Therapy, Thomas Jefferson University, caitlin.bartoszek@jefferson.edu

Emily F. Creran, SPT
Department of Physical Therapy, Thomas Jefferson University, emily.creran@jefferson.edu

Brianna A. Inge, SPT
Department of Physical Therapy, Thomas Jefferson University, brianna.inge@jefferson.edu

Marc D. McShane, SPT
Department of Physical Therapy, Thomas Jefferson University, marc.mcshane@jefferson.edu

Follow this and additional works at: http://jdc.jefferson.edu/dptcapstones

Recommended Citation
Streisfeld, SPT, Gabriel; Bartoszek, SPT, Caitlin E.; Creran, SPT, Emily F.; Inge, SPT, Brianna A.; McShane, SPT, Marc D.; and Johnston, PT, PhD, MBA, Therese E., "The relationship between body positioning, muscle activity, and spinal kinematics in cyclists with and without low back pain" (2016). Department of Physical Therapy Capstone Posters. 4.
http://jdc.jefferson.edu/dptcapstones/4
The relationship between body positioning, muscle activity, and spinal kinematics in cyclists with and without low back pain

Gabriel M. Streisfeld, SPT, Caitlin E. Bartoszek, SPT, Emily F. Creran, SPT, Brianna A. Inge, SPT, Marc D. McShane, SPT, Therese E. Johnston, PT, PhD, MBA
Department of Physical Therapy, Thomas Jefferson University

BACKGROUND
- Cycling is an aerobic and low-impact method of exercise with inherent risks of overuse injuries in the lumbar spine.
- The pathomechanics and association of risk factors of lumbar spine overuse injuries in cycling are not clearly understood.
- Approximately 23 million people regularly cycle, developing at least one overuse injury in their lifetime in the USA.
- Up to 22% of cyclists experiencing time loss from activity reported low back pain injuries to be the cause.
- Hypothesized mechanisms behind the pathomechanics of LBP in cyclists include: mechanical creep, disc ischemia, muscle fatigue, over-activation of back extensors, and flexion-relaxation phenomena.
- Furthermore, incorrect bike fitting resulting in poor body positioning on the bicycle has a strong association with LBP in cyclists.

OBJECTIVES
- To determine if relationships exist between body positioning, spinal kinematics, and muscle activity in active cyclists with non-traumatic LBP.
- To explore variations in optimal positioning and bike set up in order to address variables associated with LBP in cyclists.

METHODS
- PubMed, CINAHL, Ovid Medline, Scopus searched with narrowed focus on cyclists with non-traumatic low back pain.
- Inclusion criteria: factors relating to non-traumatic low back pain in cyclists deemed “biomechanical” in nature as agreed upon by group consensus.
- Research quality assessed using Downs & Black quality assessment scale, with grading assigned based on group consensus.
- Articles overlapped in Medline & Scopus, review 2010 excluded.

RESULTS
- Seven articles eligible for review: comparative and observational studies were selected based on research question.
- 238 total subjects, all males ranging from ages 18 to 57, 120 to 160 lbs., and height of 5’3” to 6’1”.
- Four within-participant study designs, two case-control study designs, and one single-case study.
- Average Downs and Black score = 10.5 out of 27; highest score = 15 out of 27.
- Studies deemed to be of low to moderate quality.

METHODS
- PubMed, CINAHL, Ovid Medline, Scopus searched with narrowed focus on cyclists with non-traumatic low back pain.
- Inclusion criteria: factors relating to non-traumatic low back pain in cyclists deemed “biomechanical” in nature as agreed upon by group consensus.
- Research quality assessed using Downs & Black quality assessment scale, with grading assigned based on group consensus.
- Articles overlapped in Medline & Scopus, review 2010 excluded.

CONCLUSIONS
- Direct pathomechanics of overuse low back pain in cyclists have yet to be elicited.
- The prevailing relationship stemming from this review is that spinal and core muscle activation imbalances in a prolonged flexed posture associated with cycling may lead to altered spinal kinematics contributing to overuse low back pain.

REFERENCES