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November 26, 2001

Karin Jansson
Swedish Backcare System, Inc.
Plaza South, Suite 106
4475 U.S. 1 Hwy. South
St. Augustine, FL
32086

Dear Karin,

This past summer I teamed up with Dr. Chris Colloca, State of the Art Chiropractic Center, P.C., Phoenix, Arizona and he and I completed a small clinical trial focusing on electromyographic changes during traction using the Back-A-Traction.

I have finished the analysis of the data and an abstract has been submitted to the following conference:

2002 *International Society for the Study of the Lumbar Spine (ISSLS)*, Cleveland, Ohio, May 14-18, 2002.

Enclosed is a short (ISSLS submission) and long version of the abstract. The results are very interesting and we would like to continue clinical trials using the Mastercare system. In particular, we would like to

a) examine the influence of increased inversion angle on the sEMG output,
b) measure trunk strength changes in a more quantitative manner (using both trunk torque and sEMG)
c) use lateral x-rays to measure spinal geometry changes during traction.

Dr. Colloca and I are wondering if Mastercare AB would be interested in supporting

a larger clinical trial (100 or more subjects) to begin next Summer. This trial would address a-c above. Such a study could be conducted with a modest amount of funding (from a research standpoint at least): $50,000. Approximately half of this amount would provide part-time support for an Associate to coordinate the clinical trial in Dr. Colloca's office and in Dr. Terry Peterson's office. A portion of the funds would be used to cover expenses associated with the sEMG measurements, torque measurements and x-ray costs. The remainder of the funds would be used for travel expenses (ISSLS 2002) and summer support for myself to spend 1 month in Phoenix during July-August 2002.

Note that Chris and I are planning on traveling to Gothenburg, Sweden during March 2002 and possibly during June 2002. This might be a good opportunity to meet with you and the Scandinavian headquarters folks to discuss this and other projects. I will give you a heads-up as soon as I confirm our travel dates.

In the meantime, thanks for letting us use the Back-A-Traction device.

Sincerely,

Tony

Tony S. Keller, Ph.D.
Associate Professor and Interim Chair

enclosure(s)

SHORT (300 WORD) ISSLS SUBMISSION

INTERNATIONAL SOCIETY FOR THE STUDY OF THE LUMBAR SPINE
Abstracts for the 2002 Meeting, CLEVELAND, USA, MAY 14-18, 2002

DEADLINE, NOVEMBER 15, 2001

PLEASE TYPE

Title: Traction Induces Paraspinal Muscle Changes Following 15° Prone Inversion.

Authors: (please underline presenter's name)

C.J. Colloca, T.S. Keller, T.K. Peterson

Corresponding Author: (name, address, country, fax, phone & email)

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****This is my authorization for this abstract, if accepted, to be published in the Journal Spine. **Signature of first author** (sign here) _____

Presentation Type:

Paper or poster __X__, paper only _____, poster only _____

Categories (select one)		**Modifiers** (select one)	
__X	1. Back Pain	___	A. Epidemiology
___	2. Disc Degeneration	___	B. Diagnosis
___	3. HNP	__X	C. Non-op Treatment
___	4. Stenosis	___	D. Work Retention/Rehabilitation/Psychosocial
___	5. Spine Instability/Trauma	___	E. Surgical Treatment
___	6. Spine Deformity	__X	F. Biomechanics
___	7. Spine Tumor/Infection/Metabolic	__X	G. Basic Science/Pathophysiology

Electronic submission of abstracts is encouraged and will require all of the information on this sheet followed by a structured abstract as outlined (**300 words or less in 4 headings of Introduction, Methods, Results, Discussion**) in the "Call for Abstracts". This can be e-mailed to:

Shirley.Fitzgerald@swchsc.on.ca , or if sending by regular mail to the address below.
If e-mailing abstract please fax or mail the cover sheet with signature as well.

LONG VERSION

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Traction Induces Paraspinal Muscle Changes Following 15° Prone Inversion

C.J. Colloca, T.S. Keller, T.K. Peterson

Introduction. Research aimed at investigating the active role of trunk muscle function and new treatment approaches are sought to maintain optimal trunk function and to assist in the management of back pain. The purpose of this study was to investigate the acute effects of lumbar traction on paraspinal muscle function.

Methods. Fourteen subjects (7 male, 7 female) with no recent history of back pain participated in the study. Prior to testing, each subject was familiarized with the operation of a traction therapy table (Mastercare Back-A-Traction) that is designed to gravity-traction the trunk and extremities, and is equipped with a sliding backrest. Each subject performed a series of procedures as follows: isometric trunk extension strength while standing, horizontal prone-lying for 2 minutes, 15° prone-lying inversion for 10 minutes with knee flexion at 2 minute intervals, horizontal prone-lying for 2 minutes, and isometric trunk extension strength while standing. Surface, *linear enveloped*, electromyography signals (sEMG) were recorded from the erector spinae musculature at L3 and L5 throughout these procedures. Within subject changes in sEMG output were quantified, and post-inversion isometric trunk strength was compared to pre-inversion isometric extension strength.

Results. In a few subjects, shifts in the baseline sEMG baseline were observed during the resting periods of the prone-lying phase of the inversion procedure, but the majority of subjects showed no changes. During the 10-minute inversion period, knee flexion activities were associated with a consistent sEMG output (27.8% of upright isometric extension values). Following the inversion procedure, 76.8% of the 56-combined electrode measurements (14 subjects x 4 electrodes) showed a significant decrease in isometric extension sEMG output (-14% decrease, $p = 0.018$).

Discussion. Alterations in trunk extensor muscle function were observed during and following 15° prone-lying inversion combined with knee flexion exercises, the latter significantly challenging the paraspinal muscles. Additional work is needed to determine the effects of longer duration inversion and/or increased inversion angle, as well as the therapeutic benefits of gravity-based traction.

Traction Induces Paraspinal Muscle Changes Following 15° Prone Inversion

C.J. Colloca, T.S. Keller, T.K. Peterson

Introduction. The human spine is a highly loaded structure comprised of a complex arrangement of passive and active tissues that maintain alignment and stability. Research aimed at investigating the active role of trunk muscle function and new treatment approaches are sought to maintain optimal trunk function and to assist in the management of back pain. The purpose of this study was to investigate the acute effects of lumbar traction on paraspinal muscle function.

Methods. Fourteen subjects (7 male and 7 female) with no recent history of back pain participated in the study. Prior to testing, each subject was familiarized with the operation of a commercially available traction therapy table (Mastercare Back-A-Traction, Swedish Backcare Systems, Inc., St. Augustine, FL) that is designed to gravity-traction the trunk and extremities, and is equipped with a sliding backrest. While in the upright posture, pre-gelled, bipolar electromyography electrodes were located bilaterally over the L5 and L3 paraspinal musculature. Subjects were asked to practice operation of the traction table one to two times prior to data collection, while gain settings were adjusted to ensure the proper settings and working order of the electromyography equipment and electrodes. Each subject then performed a series of procedures as follows: maximum effort isometric trunk extension exertions while standing, horizontal prone-lying for 2 minutes, 15° prone-lying inversion for 10 minutes with knee flexion at 2 minute intervals, horizontal prone-lying for 2 minutes, and maximum effort isometric trunk extension exertions while standing. Surface, *linear enveloped*, electromyography signals (sEMG) were recorded at 10 Hz from the erector spinae musculature at L3 and L5 throughout these procedures. Within subject changes in sEMG output (min, max, peak-peak, average) during the various procedures were quantified. A two-tailed, paired-observations t-test was performed to determine if the post-inversion isometric trunk strength (peak sEMG output) differed significantly from the pre- inversion isometric trunk strength.

Results. In a few subjects, shifts in the baseline sEMG baseline were observed during the resting periods of the prone-lying phase of the inversion procedure, but the majority of subjects showed no baseline changes in sEMG output. Knee flexion activities, however, were associated with a consistent and marked increase in sEMG output during the 10-minute inversion period. The mean peak-peak sEMG output during knee flexion was 27.8% (SD 28.9) of the isometric trunk extension exertions. Following the horizontal and inversion prone-lying procedures, 76.8% of the 56-combined electrode measurements (14 subjects x 4 electrodes) showed a significant decrease in the isometric trunk testing sEMG output (mean change pre-post = -14%, $p = 0.018$).

Discussion. Alterations in trunk extensor muscle function were observed during and following 15° prone-lying inversion combined with knee flexion exercises, but changes in baseline sEMG response that were originally hypothesized to be associated with muscle lengthening were not observed. Knee flexion exercises performed by the subjects during inversion, however, were found to significantly challenge the paraspinal muscles. Moreover, the short-duration traction procedure had a negative effect on acute back extension strength assessed using sEMG. Additional work is needed to determine the effects of longer duration inversion and/or increased inversion angle, as well as the therapeutic benefits of gravity-based traction.