Evidence Table
Capstone Case Report: Hip & Low-Back Pain in a Patient Presenting with Limb Length Inequality & Sacroiliac Joint Dysfunction: A Case Study

Articles Highlighting the Importance of Regional Interdependence						
Journal (Year) Authors & Title	**Purpose of Study**	**Subjects and Inclusion Criteria**	**Methods / Intervention**	**Statistically Significant Results**	**Conclusions**	**Clinical Significance**
Clinical Biomechanics (2007) Noehren, B., Davis, I., & Hamill, J. *Prospective Study of the Biomechanical Factors Associated with Iliotibial Band Syndrome* [1]	Prospectively compare pre-existing frontal and transverse plane lower extremity kinematics and kinetics between a group of female runners who develop ITBS compared to healthy controls.	400 subjects Inclusion: run a minimum of 20 miles/wk, 18-45 y.o., free from injury at the time of data collection.	-Bilateral 3D LE kinematic/ kinetics during running were collected for all runners, wearing a standard neutral running shoe; along a 25 m run way at a speed of 3.7m/s striking a force plate at its center, 5 trials collected during the stance phase of running. -Anatomical markers were placed over the GT, M/L femoral epicondyles, M/L malleoli, and 1st and 5th metatarsal heads; and the front end of the shoe. -Subjects gait analysis completed; then were followed for 2 years. 18/400 runners developed ITBS. Initial running mechanics were compared to a group of age & mileage matched controls without hx of knee or hip pain. -Comparisons of peak hip, knee, & rearfoot angles and moments were made during the stance phase of running.	ITBS group exhibited significantly greater hip adduction and knee internal rotation at landing and throughout stance. Femoral external rotation was significantly greater in the ITBS group. Rearfoot eversion and knee flexion were similar between groups. 4 subjects with ITBS had peak rearfoot motion > 9.7° (the mean of the ITBS group) also had higher tibial internal rotation when compared to the rest of the ITBS group. There were no differences in moments between groups.	The development of ITBS appears to be related to increased peak hip adduction and knee internal rotation. These combined motions may increase ITB strain 2° compressing against the lateral femoral condyle. There is the potential that those with excessive rearfoot eversion and tibial internal rotation will also be more likely to develop ITBS, but this distal mechanism requires an orthotic intervention for management.	Tx interventions should focus on controlling secondary plane mvmts w/ strengthening & neuromuscular re-ed of the hip & stretching of the ITB to increase overall compliance of the ITB itself. This was a prospective study, which are the benchmark for establishing cause and effect relationships, but are costly in terms of recruitment and follow-up. Results were consistent w/ retrospective studies previously reported, suggesting that runners with ITBS may not change their mechanics as a result of their injury, so retrospective studies are adequate for research design in this population.
Journal of Bodywork & Movement Therapies (2010) Panayi, Stephanie *The need for lumbar-pelvic assessment in the resolution of chronic hamstring strain* [2]	Review Presents a lumbar-pelvic assessment and treatment model based on a review of clinical and anatomical research for consideration in the tx of chronic hamstring strain.	Review Article – Not Applicable	Not Applicable	Not Applicable	-The origin of the biceps femoris muscle attaches to the pelvis at the ischial tuberosity and to the sacrum via sacrotuberous ligament. -The biomechanics of the sacroiliac joint and hip, along with lumbar-pelvic stability, therefore play a significant role in hamstring function. Joint proprioceptive mechanisms may play a role in re-establishing balance.	Assessment of lumbopelvic biomechanics may play a valuable part in successful resolution of chronic hamstring strain. Pelvic asymmetry and/or excessive anterior tilt can lead to increased tension at the biceps origin and increase functional demands on the hamstring group by inhibiting its synergists.
Journal of Athletic Training (2011) Nguyen, A-D., Shultz, S., Schmitz, R., Luecht, R., & Perrin, D. *A Preliminary Multifactorial Approach Describing the Relationships Among LE Alignment, Hip Muscle Activation, and Lower Extremity Joint Excursion* [3]	Descriptive Laboratory Study To describe the relationship among static lower extremity alignment (LEA), hip muscle activation, and hip and knee motion during a single-leg squat	30 men and 30 women recruited from the college campus of the University of North Carolina at Greensboro	-Each SL-squat trial was performed @a speed of 5 sec. from the starting position to 60° of knee flexion. Rate was controlled by a metronome set at 60 beats per minute. -Initial joint angles were calculated as the avg jt. positions during the 1st sec. after transition from DLS to SLS. Final jt. angles calculated as the value when participants achieved 60° of knee flex -Structural equation modeling evaluated whether increased LEA & decreased hip muscle activation predicted greater functional valgus collapse during a single-leg squat	-Smaller pelvic angle and greater femoral anteversion, tibiofemoral angle, and navicular drop predicted greater hip internal rotation excursion and knee external rotation excursion. -Decreased gluteus maximus activation predicted greater hip internal rotation excursion but decreased knee valgus excursion. -No LEA characteristic predicted gluteus medius or gluteus maximus muscle activation during the SL-squat.	-Static LEA, characterized by a more internally rotated hip and valgus knee alignment and less gluteus maximus activation, was related to commonly observed components of functional valgus collapse during the SL-squat. -Specifically, individuals with greater femoral anteversion and navicular drop went into more hip internal rotation and individuals with greater tibiofemoral angle and femoral anteversion went into greater knee external rotation.	Differences in LEA and gluteal muscle activation contribute to greater hip joint and knee joint excursion during functional activities. Supports findings of the direct relationship between greater femoral anteversion and increased hip internal rotation, leading to a compensatory increase in knee external rotation.

Psychometrics of Clinical Assessments Used in Lumbopelvic Dysfunction and Limb Length Inequality						
Journal (Year) Authors & Title	**Purpose of Study**	**Subjects and Inclusion Criteria**	**Methods / Intervention**	**Statistically Significant Results**	**Conclusions**	**Clinical Significance**
Physical Therapy (2007) Hungerford, B., Gilleard, W., Moran, M., & Emmerson, C. *Evaluation of the Ability of Physical Therapists to Palpate Intrapelvic Motion with the Stork Test on the Support Side* [4]	Determine whether experienced therapists could reliably detect the pattern of motion occurring between the innominate bone and the sacrum (intrapelvic motion) on the support side in a group of subjects with and without lumbopelvic pain.	33 subjects – volunteers who responded to notices placed at private PT practices.	3 manual therapists (mean of 14.7 years in practice) assessed the 33 subjects (each subject was tested once by each therapist, totaling 3 repetitions of the test for each subject) using a set of standard instructions for the performance of the test.	-Interrater reliability for part 1 (in which each therapist was asked to rate the direction of intrapelvic motion with a 3-point scale) was moderate for both the left and right sides: κ=.59 for L & R, with PCA 83.% (L) and 79.8% (R). -Interrater reliability for part 2 (in which each therapist was asked to rate the direction of intrapelvic motion with a 2-point scale) was good for both the left and right sides: κ=.67 (L) and κ=.77 (R), with PCA 91.9% (L) and 89.9% (R)	-Results indicate that multiple therapists showed good reliability for determining a positive or negative result in the Stork Test on the support side. -The application of the Stork Test will be more reliable if clinicians describe their palpation findings as either negative results (no relative movement between the innominate bone and sacrum), or positive results (cephalad motion of the PSIS relative to the sacrum).	The Stork Test on the support side is not reliant on a provocation of pain, or on a clinical comparison of degrees of jt. mobility between sides of the body or between subjects. The Stork Test assesses the ability of a subject to maintain a stable alignment of the innominate bone relative to the sacrum during a fxnl load transfer task. With normal fxn there's min. intrapelvic motion, indicated by a (-) Stork. A (+) test suggests an inability of the SIJ to engage the self-bracing mechanism & maintain alignment of the innominate bone relative to the sacrum, rotating anteriorly.
Singapore Medical Journal (2011) Jamluddin, S., Sulalman, A., Kamarul, I., Juhara, H., Ezane, M., & Nordin, S. *Reliability and Accuracy of the Tape Measure Method with a Nearest Reading of 5 mm in the Assessment of Leg Length Discrepancy* [5]	Cross-sectional study	35 patients with limb length discrepancy and 13 without limb length discrepancy	-Two blinded orthopedic surgeons measured the LE's of 48 patients using TMM with the patients positioned supine from ASIS (1st bony prominence felt by palpation proximally along the inguinal ligament) to the distal tip of the medial malleolus w/ the nearest 5mm using standard tape measure. -22 of the patients underwent LLD measurement with CT by 2 blinded radiologists using an AP scout scanogram of the LE's w/ the patient supine. Measurement of distance between the superior lip of the acetabulum to the distal end of the tibia were taken.	-Interrater reliability of LLD measurement using TMM (n=48 patients) at 95% CI had a ICC of 0.92 indicating a high correlation. -Interrater reliability of LLD using CT (n=22 patients) at 95% CI had a ICC of 0.97, indicating high correlation. -Comparison of the findings of TMM conducted by the first surgeon to the CT findings by the first radiologist (for consistency of results) had an ICC of 0.81 (good correlation)	-TMM with a nearest reading of 5mm was found to have better interrater reliability compared to TMM with a nearest reading of 1mm utilized in other studies.	TMM with a nearest 5mm reading from ASIS to medial malleolus can be used to reliably assess magnitude of LLD in patients clinically.
JOSPT (1984) Woerman, A. & Binder-Macleod, S. *Leg Length Discrepancy Assessment: Accuracy and Precision in Five Clinical Methods of Evaluation* [6]	Five clinical methods of leg length discrepancy assessment were tested against one another for their relative accuracy and precision compared to exact anatomical standards as determined by radiograph.	5 subjects, 3 males and 2 females who met criteria for normalcy for the LE's according to Hoppenfeld. 2 subjects, one male and one female, were obese. One of the nonobese male subjects demonstrated a true	-20 PTs of varying experience & clinical backgrounds evaluated LLD 5 subjects. -2 measurement sessions were conducted with ½ of the therapists randomly assigned to one of the sessions. Each session consisted of 3 phases: I) Pre-instructional: direct measurement of LLD for each subject to the nearest millimeter (ASIS to medial malleolus, ASIS to lateral malleolus, and umbilicus to medial malleolus),	-For the 10 test situations between phase I and phase II, the ASIS to lateral malleolus method was the most accurate in 5/10 instances and the umbilicus to medial malleolus method was the most accurate in 2/10 instances. -Introduction of the precise palpatory techniques in phase II resulted in increased accuracy for ASIS to lateral malleolus method but not ASIS to medial malleolus. -The indirect method proved to be	-The method of umbilicus to medial malleolus was the most inaccurate and imprecise of all methods -The method of ASIS to lateral malleolus proved to be a generally more accurate and precise tool in most test situations. -The indirect method was the most precise and accurate method for LLD assessment of all methods tested, but tended to measure short to the actual.	Using the measurement of umbilicus to medial malleolus is an unacceptable clinical tool. Using the method of ASIS to lateral malleolus may be superior to using the method of ASIS to medial malleolus, but both methods depend on the ability of the therapist to appropriately palpate the ASIS and the distal landmarks.

		LLD of 1.3 centimeters radiographically.	II) Post-instructional: same direct measurements of LLD of each subject were taken, but this time, specific palpatory techniques for localization of bony landmarks were used. III) LLD assessment using the indirect method. Lifts used were 0.125 - centimeters in thickness.	significantly more precise than any other method, while, of the direct methods, ASIS to lateral malleolus was the most precise.		The indirect method appears to be an excellent tool clinically. In situations where use of a direct method of LLD assessment is indicated to differentiate between a true or functional LLD, the ASIS to lateral malleolus method should be employed in favor of any other direct method tested.
JOSPT (1998) Gross, MT., Burns, CB., Chapman, SW., Hudson, CJ., Curtis, H., Lehmann, JR., & Renner, JB. *Reliability and Validity of Rigid Lift and Pelvic Leveling Device Method in Assessing Functional Leg Length Inequality*[7]	To determine the reliability and validity of assessing functional LLI using a pelvic leveling device.	19 women and 13 men between the ages of 18 and 55 who reported having a diagnosed or suspected LLI.	-An initial radiograph was taken to estimate the magnitude of the subjects LLI -Clinical determination of LLI was made by placing rigid lifts (1/8th inch thickness) under the suspected shorter LE until the pelvic leveling device indicated that the IC's were level. This was done once by investigator #1, then repeated a 2nd time by investigator #2. -A 2nd standing radiographic measurement of LLI using rigid lifts (amt of lift needed was determined by analysis of the first radiograph and only taken if >0.16 mm difference was observed in a subject) under the shorter LE were used to establish validity of the clinical method. -Magnitude of the LLI was recorded in cm as a (-) value if boards were placed under the L foot, and a (+) value if boards were placed under the R foot.	-Mean absolute difference between the 2 clinical measurements of LLI by the same investigator was 0.29 cm with ICC=0.84 (intrarater reliability) -The mean absolute difference between the 2 clinical measurements of LLI by two investigators was 0.49 cm with an ICC=0.77 (interrater reliability) -The mean absolute difference of agreement reflecting agreement between radiographic measurements and clinical measurements of LLI was 0.64 with an ICC=0.58 for the first investigator, and 0.76 with an ICC=0.55 for the second investigator.	The ICC values and absolute difference results in this study indicate unacceptable reliability and validity for the rigid lift and pelvic leveling device method used in this study.	Clinicians who use pelvic leveling devices should calibrate devices prior to use for assessments of LLI. The pelvic leveling device itself was found to have unacceptable reliability and validity. Clinicians should consider using low dose radiographs to asses positions of femoral and pelvic landmarks of patients who have appreciable amts of subcutaneous fat overlying these landmarks. Pelvic rotations in planes other than the frontal plane may be associated with the presence of LLI in some patients. Clinicians should assess as many pelvic landmarks as possible to determine if such rotations are present.
Manual Therapy (2005) Laslett, M., Aprill, C., McDonald, B., & Young, S. *Diagnosis of Sacroiliac Joint Pain: Validity of Individual Provocation Tests and Composites of Tests*[8]	Cohort Study Look at the utility of sacroiliac joint provocation tests for diagnosing sacroiliac joint pain	48 subjects (32 females, 16 males) Inclusion Criteria: pts with buttock pain, with or without lumbar or LE symptoms. Subjects drawn from the New Orleans metropolitan area; referred to the study by a variety of medical and allied health practitioners and a few were self-referred	-Clinical exam was completed; it included SIJ provocation tests (distraction, thigh thrust, Gaenslen's Test, compression, and sacral thrust), a McKenzie exam of the lumbar spine, and a hip joint assessment -Each subject then received a SIJ injection using corticosteroid within 30 minutes of completion of the clinical exam; if there was 80% of pain reduction or greater, those subjects were then scheduled for a confirmatory block to accurately diagnose SIJD.	-Of the 48 subjects, 16 had positive SIJ injections. The provocation SIJ tests provoked familiar pain in those patients confirmed by diagnostic injection as having a painful SIJ pathology more common than those with negative injections. **Individual tests:** sensitivity of 0.50-0.88; specificity of 0.69-0.81 **Composite tests (3 or more):** sensitivity of 0.94; specificity of 0.78	-An optimum composite rule was to identify the SIJ as the pain generator is there were **3 or more positive tests**, with estimated sensitivity of 93.8%, specificity of 78.1%, and area under the curve of 0.842). -The distraction test had the highest single PPV and AUC, the thigh thrust, compression, and sacral thrust tests improved the overall diagnostic ability. -Distraction, thigh thrust, compression, and sacral thrust tests should be performed, stopping when there are 2 positives.	When all provocation SIJ tests are negative, symptomatic SIJ pathology can be ruled out. The thigh thrust test is the most sensitive test and the distraction test is the most specific test, so these two tests should be performed first. If both tests provoke similar pain, no further testing is indicated. If one test is positive, the compression test is applied. If this is painful, SIJD is likely. If it is not painful, SIJD is not likely. If a patient has pain with all of the tests, this is not a reliable interpretation of SIJD.

Articles Highlighting Orthotic Intervention, Muscle Energy Techniques, and Modification of Soft Tissue Forces for Structural and Functional Limb Length Inequalities						
Journal (Year) Authors & Title	**Purpose of Study**	**Subjects and Inclusion Criteria**	**Methods / Intervention**	**Statistically Significant Results**	**Conclusions**	**Clinical Significance**
Spine (1983) Friberg, Ora *Clinical Symptoms and Biomechanics of Lumbar Spine and Hip Joint in Leg Length Inequality*[9]	Demonstrate reliability of a low-dose radiographic method for determining leg length inequality and describe the effects of correcting the leg length inequality with adequate shoe lift.	1157 subjects Control group: 359 symptom-free Finnish Army conscripts 653 patients with chronic LBP (>3mo. hx &/or had recurred ≥ 3 times), with or without sciatica (+ SLR test and radiation into the LE) 254 patients with chronic unilateral hip pain symptoms, with or without arthrosis	-All patients underwent a comprehensive clinical examination of the musculoskeletal system, as well as radiologic measurement of LLI by a low dose radiologic method that exposes only the hip joints, and LLI is measured between the heights of the highest articular points of the femoral heads (Wiberg's angle). -If any of the patient's had never had a lumbosacral radiograph, it was done. -In patients w/ LLI of ≥ 10 mm, inserts &/or outside shoe elevation was done in the shoe of the shorter leg -To avoid overcompensation, the lift was a few mm less than LLI measured -Subjects were followed for at least 6 months for response following shoe lift.	-LLI was less than 4 mm in 24.6% of the patients with chronic LBP, and 56.5% of symptom-free controls -LLI was 5 mm or more in 75.4% of the patients with chronic LBP, and 43.5% of symptom-free controls. -The difference between symptomatic patients and controls is statistically highly significant ($p<0.001$). - The incidence of LLI of 15 mm or more is 5.32x that of symptom-free controls. -179/228 (78.5%) had sciatica radiating into the longer LE, vs. 49/228 (21.5%) into the shorter LE. -226/254 (88.9%) of patients with chronic hip pain, had pain on the side of the longer extremity -109 patients had ipsilateral sciatica and chronic hip pain concomitantly -320 patients with LLI 5mm or more were given an internal &/or external shoe lift; 96 patients have been symptom-free for ≥ 6 months	-Mean age of the symptom-free control group in this study (20 years) gives an idea of the prevalence of LLI rather than presenting a group reliably comparable with the significantly older low-back pain patients., and it is not known how many of these young subjects will later develop symptoms. -Correcting the LLI simply with an adequate shoe lift resulted in a permanent and mostly complete alleviation of symptoms in the majority of the cases. -The unilateral symptoms associated with mostly unrecognized LLI of 5-25mm were due to biomechanical responses like bending and rotational forces needed for compensation of the lateral imbalance cause by LLI	High prevalence of LLI in patients with LBP has been established Positive results of the simple and non-invasive shoe lift under the foot of the short leg have been reported. Application of shoe lift therapy is recommended for clinical use as an inexpensive, safe, and noninvasive alternative to methods of treatment that have already proven unsatisfactory.
Pain (2007) Ferreira, M.; Ferreira, P.; Katimer, J.; Herbert, R.; Hodges, P.; Jennings, M.; Maher, C.; Refshauge, K. *Comparison of General Exercise, Motor Control Exercise, and Spinal Manipulation Therapy for Chronic Low Back Pain: A Randomized Trial*[10]	Randomized Controlled Trial To compare the effects of general exercise, SMT, and motor control exercise for chronic low back pain	Pt.'s receiving PT from 3 teaching hospitals in Sydney, Australia Inclusion: non-specific low back pain for ≥ 3 months, 18-80 y.o.; given written informed consent	Baseline measurement prior to randomization, during follow-up appointments at 8 wks., 6 months, and 12 months -Patient-Specific Functional Scale (PSFS) -Global Perceived Effect -Pain (VAS) -Roland-Morris Disability Questionnaire Up to 12 tx sessions over 8 wk period **General Exercise:** class of up to 8 pt.'s for 1 hr consisting of strengthening/stretching for main mm groups and exercise for CV fitness **Motor Control:** exercises aimed at improving fxn of specific trunk mm's (TA, MTF, diaphragm, pelvic floor). **Spinal Manipulation:** joint mobs or manipulation techniques. NO exercises or HEP. Advised to avoid pain-aggravating activities.	Outcomes of all 3 groups improved over 12 months following randomization. In the short-term, the motor control exercises and SMT groups had greater improvement than the general exercise group	Motor control exercise and SMT produced slightly better short-term function and perceptions of effect than general exercise, but not better medium to long-term effects, in patients with chronic non-specific back pain.	Inclusion of spinal manipulative therapy and motor control exercises for patients with significant pain or disability has the potential to improve the outcomes in the short term for patients with greater than 3 months history of low back pain. Including motor control (spinal stabilization) exercises as opposed to general exercises in your arsenal of conservative tx options will have a more positive effect on treatment outcomes.

Spine (2006) Goldby, L.; Moore, A.; Doust, J.; Trewy, M. *A RCT Investigating the Efficiency of Musculoskeletal Physical Therapy on Chronic LBP Disorder* [11]	Randomized Controlled Trial To determine the efficacy of 2 components of MSK PT – spinal stabilization program and manual therapy intervention – on chronic LBP.	Referred from primary care physician to PT department Inclusion: chronic LBP (current episode ≥ 12 wks); 18-65 yo.; able to read/write English	-All outcomes assessed @ Baseline, 3 months, 6 months, 12 months, & 24 months: **-Spinal Stab Program**: 10-wk course of exercise class to retrain transverse abdominis, multifidus, pelvic floor, & diaphragm muscles; video shown @ beginning & end of each session; 2 PTs per ≤ 12 patient's; 10 1hr sessions max **-Manual Therapy:** manual tx @ the discretion of treating PT, ≤ 10 sessions; Allowed NO stab exercises/modalities. **-Education:** booklet "Back In Action" explained by PT **-All Groups:** Back School: 1 group specific 3-hr q&a re: anatomy/phys; lifting mechanics; general advice	-Between entry & 3-months, highest reduction in pain in manual therapy group. Improvement in spinal stabilization group at 6 months for pain and quality of life; and at 12 months for meds, quality of life, & disability.	-10-week spinal stabilization program is more effective than manual therapy or education alone at reducing pn, disability, medication intake, & improving quality of life in pts with chronic LBP. -In pt.'s who recorded ≥ 50 on the numerical pain rating scale for LBP @ entry, manual tx was most effective for pain relief.	Inclusion of a component of spinal stabilization emphasizing the transverse abdominis, multifidus, pelvic floor, & diaphragm leads to better long-term patient outcomes than manual therapy or education alone. Considering spinal stabilization & Spinal Manipulation Therapy alone, they are both effective for pain reduction, but spinal stabilization program is more effective in the long term.

Biomechanical Factors Associated with Limb Length Inequality

Journal (Year) Authors & Title	Purpose of Study	Subjects and Inclusion Criteria	Methods / Intervention	Statistically Significant Results	Conclusions	Clinical Significance
Spine (1993) Cummings, G., Scholz, J., & Barnes, K. *The Effect of Imposed Leg Length Difference on Pelvic Bone Symmetry* [12]	Examine the effect of varying degrees of imposed leg length difference on symmetry of the innominate bones in healthy college women with relatively equal leg lengths.	10 female college students recruited by posting a notice describing the experimental procedures on university bulletin boards.	-Subjects leg length was determined by clinical and roentgenographic procedures. Position of the innominate bones w/ and w/out lifts under one foot were measured with respect to the transverse plane. -Side of lift (right or left) and lift size (2/8, 3/8, 4/8, 5/8, 6/8, or 7/8 inch) combination was randomized across 6 trials for each condition. -A control trial was included as the first trial of each block, with no lift under either foot. -Subjects were instructed to avoid any compensatory knee flexion or weight shifting.	-A lift placed under the L foot resulted in posterior tilting of the L innominate and anterior tilting of the R innominate. A lift placed under the R foot led to the opposite effect. -Degree of pelvic obliquity increases linearly with the size of the lift from 1/8-7/8 inch.	-This study confirms that an imposed LLD causes pelvic obliquity, with posterior rotation of the innominate over the longer leg and simultaneous anterior rotation over the shorter leg.	While this study did not investigate whether the same pelvic obliquity occurs in subjects with functional or anatomic LLD, the fact that it does is suggested by most of the clinical opinion cited in the review of the literature, and this study gives support to this clinical opinion.
Gait and Posture (2000) Young, R., Andrew, P., & Cummings, G. *Effect of Simulating Leg Length Inequality on Pelvic Torsion and Trunk Mobility* [13]	To ascertain whether artificially modifying leg length, using relative iliac crest height as a criterion, would be associated with alterations in pelvic torsion or trunk mobility	29 subjects – 7 men and 22 women were recruited from Georgia State University campus. Young, healthy adults with no known problems in the lumbosacral region	-Subjects were examined to confirm absence of scoliosis, SIJD(judged present if 3/4 of the following tests were (+): standing flexion test, prone knee flexion test, supine long sitting test, and Piedallu's Sign), and asymmetry in the ankles and feet. -Subjects informed to stand erect but relaxed, to bear weight equally on both feet w/ feet 150 mm apart, & to maintain very light contact of the pelvis with the bar in front. A custom-made inclinometer with a digital display to measure lateral pelvic tilt and innominate inclination was used. The heights of the lifts ranged from	-Inserting a lift under one foot to elevate one IC higher than the other significantly increased pelvic torsion (the disparity in rotation between the two innominates viewed in the sagittal plane) compared to the amount of pelvic torsion when the IC's were of similar heights ($P<0.001$). -The innominate contralateral to the side of the elevated IC tended to be more anteriorly inclined and more anteriorly tilted than the opposite innominate. -When a lift was placed under one foot to elevate the IC, lateral	-Imposing an artificial LLI by introducing a lift (between 15-24 mm in height) under one foot made the contralateral innominate more anteriorly rotated than the innominate lift side. -Flexion of the trunk towards the side of the lift increased, suggesting that the functional scoliosis induced by the lift might constrain lateral flexion of the spine in an asymmetrical manner. -The results on lateral flexion, taken from subjects with relatively subtle LLI's are similar to previously published radiographic	Pelvic torsion appears to result from the asymmetrical situation of unequal leg lengths, presence of a lateral pelvic tilt should serve as an alarm to search further for signs of bilateral asymmetry from the pelvis itself down to the feet. 15-24 mm is NOT a 'clinically negligible' difference of leg length inequality 1-2° of pelvic tilt signals need for further examination of possible LLI

			15-24 mm.	flexion became greater towards the side of elevation (P<0.01) -In the 8 subjects with preexisting lateral pelvic tilts of 1.8° or greater, when a lift was used on the side of the lower IC to reduce the lateral pelvic tilt, the subject exhibited more lateral flexion toward the side of the originally lowered IC than in natural conditions.	measurements in subjects with obvious LLI's, so the authors conclude that relative heights of the iliac crests can provide clinically useful evidence for suspecting leg length inequality.	

List of Abbreviations: ITB=iliotibial band; ITBS=iliotibial band syndrome; LE=lower extremity; GT=greater trochanter; M/L= medial/lateral; hx=history; IR=internal rotation; ER=external rotation; 2°= secondary to; tx=treatment; mvmts=movements; w/= with; re-ed=re-education; sec.=seconds; avg=average; jt.=joint; SL=single leg; SLS= single leg stance; DLS=double leg stance; PT= physical therapist; κ =Cohen kappa reliability coefficient; PCA= percentage of agreement; PSIS=posterior superior iliac spine; fxn=function; fxnl=functional; (+)=positive; (-)=negative; LLD=limb length discrepancy/difference; TTM=tape measure method; ASIS=anterior superior iliac spine; CT=computed tomography; AP=anteroposterior; CI=confidence interval; ICC=intraclass correlation coefficient; LLI=limb length inequality; IC=iliac crest; MSK=musculoskeletal; SI=sacroiliac; SIJ=sacroiliac joint; SIJD=sacroiliac joint dysfunction; PPV=positive predictive value; AUC=area under the curve; LBP=low back pain; SLR=straight leg raise; LE=lower extremity