Integrative Manual Therapy (IMT)

DR. ASIF ISLAM PT
SMC.UOS

IMT

MUSCLE ENERGY AND 'BEYOND' TECHNIQUE

MUSCLE ENERGY AND 'BEYOND' TECHNIQUE

A CONCEPT OF BIOMECHANICS AND THE QUANTUM ENERGETIC FORCES WITHIN THE INTRA-ARTICULAR JOINT SPACES

The Intra-Articular Spaces of Sacral Joints:

Treatment of biomechanical dysfunction is not unique.

- For a long time, many disciplines have attempted to achieve long-lasting effects on joint dysfunction, especially at the lumbosacral junction (L5/Sl).
- The attempts have been unsuccessful,

  i.e., there does not appear to be one good solution for the tens of thousands of persons affected by low back pain and sciatica.

Most spinal surgery occurs at this L5/Sl junction,

- which reflects that this problem causes significant pain and disability, as well as high cost for health care recipients and tax-payers.

- The lumboscral junction has always been assessed, until recently, for signs of limited mobility.
- Essentially, L5 at the lumbosacral junction has been assessed like every other spinal segment.
- This evaluation is not adequate.
- There is a difference between L5 and other lumbar segments:
- the lumbosacral junction has

reciprocal motion present on three planes, which is not

- present between L1 through L5.

What is this reciprocal movement at the lumbosacral junction?

- During sagittal plane motion,

  the base of sacrum glides in the opposite direction of L5 movement:
- L5 flexes during posterior sacral glide, and L5 extends during anterior sacral glide.
- On the transverse plane, L5 rotates to the right while sacrum rotates to the left, and L5 rotates to the left while sacrum rotates to the right.
- During motion on a coronal plane, there is similar reciprocal motion,
- i.e., the sacrum side bends in the opposite direction of L5 side bending.

- There is a unique concept by Lowen and Giammatteo and others:
- ***problems of sacral biomechanics are in fact problems of the intra-articular spaces.***
- There is energy within the joint spaces surrounding sacrum, including within the sacro-iliac joints, L5 and the sacral base, and between the facets of L5 and S1.
- There may be a compromise of this energy, which is a disturbance of the quantum energetic forces within the joint spaces.

- An additional concept, which requires further explanation from a physics perspective, regards "axes."
- When there is movement which is anterior to midline, the hypothetical axis of motion is positioned anterior to the body part in motion.
- When there is posterior movement, the axis of motion is positioned behind that body part, where the movement forces are directed.
- Axes, although conceptual, are forces which are dynamic in nature, and reflect motion of moving parts.
- the direction corresponds with the position of the axis on all three planes:
- sagittal, coronal and transverse.

Sagittal plane movement at the lumbosacral junction is **flexion and extension**.

- This movement is different than lumbar spine flexion and extension, because of reciprocal motion.
- At the lumbosacral junction, when L5 flexes, it is displaced **in an antero-inferior direction**, **while the sacral base glides posterior**.
- Lumbosacral flexion includes both the anterior motion of L5 and the posterior motion of the sacral base.

Where is the axis of motion for lumbosacral flexion?

- Is there a separate anterior axis for L5, with a different posterior axis for S1?
- This is not reasonable ,because lumbosacral flexion is a **co-joined motion** of L5 together with S1.

- The axis of motion is neither in front of L5, nor behind S1.
- The axis of motion for lumbosacral flexion is between L5 and S1, through the disc, with the penetration
- being midline through the disc.
- Various phenomena of the L5 disc have been found on dissection.
- The major part of the disc to be considered appears to be the middle of the nuclear material, which is denser.
- There are less deviations from midline at the central portion of the disc during movements.

- When there is a co-joined motion in the human body between 2 structures, similar to the motion at the lumbosacral junction,

  the movement is reflexive in nature.

This **neuro-reflexogenic**- induced capacity for reciprocal motion at the lumboscral junction allows greater movement rather than lesser.

- Thus the amount of available motion on any one of the three planes for L5 and S1 is much greater than at any other vertebral segment.

- While flexion and extension occur at the lumbosacral junction, movement occurs at both **sacroiliac joints**.
- Thus there must be a co-joined motion capacity of L5,S1 together with the SI joints,

  which are neuro-reflexogenically able to cooperate with L5 and S1.
- The sacrospinous ligaments appear to be involved in this participation of co-operated activity.

- During torsions of the lumbosacral junction there is also co-joined motion between the lumbosacral junction and bilateral sacroiliac joints.
- Torsions are the major L5,51 movement during ambulation.
- These motions are tri-planar and concomitant on 3 planes:

  sagittal, coronal and transverse.
- When heel strike occurs, there are extension forces affecting the leg in stance phase, which cause a tendency of the sacrum to extend on the side of heel strike.
- Yet the sacrum cannot extend, because the piriformis is placing an anterior force on the sacrum on that side.

- The pull of the piriformis will rotate the sacrum towards the side of swing phase, and as the sacrum rotates, side bending of the sacrum occurs to the same side.
- During midstance, there is a greater force of the piriformis, causing maximal rotation of the sacrum towards the side of mid-swing phase.
- This end range of rotation will pull the sacrum in a transverse plane posterior on the side of swing phase.

The Forces of Ambulation through the Intra-Articular Spaces of the lower Quadrant

- During mid-stance towards toe-off there is a transfer of forces from the leg in Stance phase towards the leg in swing phase.
- The extension forces are decreasing throughout mid-stance towards toe-off.
- While the extension forces decrease, the tendency of the sacrum to extend is eliminated.
- The piriformis pull is decreased, so the rotation force towards the side of swing phase is reduced.
- When these rotation forces are reduced, the side bending of sacrum on the side of swing phase decreases.
- As the forces of rotation towards the swing phase side are reduced, the transverse motion of sacrum on the side of swing phase subsides.

- The articular surface of sacrum will no longer be translated on a transverse plane along the horizontal limb of the joint surface.
- When the forces of extension are eliminated as soon as toe-off occurs, there will be **an initiation of momentum induced forces** which affects the leg which is now beginning swing phase.
- These momentum forces of the body are dependent on energy, the production of ATP, and metabolic rate.
- Requirements for momentum-induced motion include muscle fiber strength, recruitment of muscle fibers, neuronal health,.

- When the foot and ground meet, during standing and ambulation, there are displacements of energy on three planes,
- These forces are transcribed up the leg within the intra-articular spaces.

The most significant intra-articular spaces are the

- tibiotalar,
- tibio-femoral,
- the femoro-acetabular spaces.

An accommodation to these forces occurs at the sacrum, within the intra-articular joint spaces of the sacroiliac joints and the lumbo-sacral junction.

- The accommodation to foot-ground forces at the **sacral joint spaces** is a major function of sacrum.
- The 3-planar forces within the sacral joint spaces, the sacroiliac joints and the lumbosacral junction, are further displaced and transcribed from those joint spaces throughout the body.
- The forces which converged in the joint spaces of sacrum are now transcribed throughout the joint spaces of the body.
- These forces are transcribed through the spinal joint spaces, and also through the intra-articular spaces of the soft joints.

These soft joints include,

for example, the joint spaces between the liver and the diaphragm, between the heart and the pericardium, and between the muscle bellies of different muscles.

- This transcription of forces occurs between cells and fibers, as well as between those larger structures which have a role of functional organization.

- In order that the forces reach the sacrum in a manner that will not cause erosion of the sacral joint surfaces, the lower extremity joints must be aligned,
  - with good articular balance
  - and good joint mobility,
  - and most of all adequate intra-articular joint spaces.

- The intra-articular spaces of the legs are able to transcribe the foot-ground forces and these forces are transcribed through every joint space
- between muscle bellies,
- between muscle and bone,
- between blood vessels and muscles,
- and between cells and fibers.

The most significant joint spaces which will determine the quality of forces affecting sacrum are the

- tibiotalar joint spaces,
- the tibiofemoral joint space,
- and the hip joint between the femoral head and the acetabulum.

Muscle Energy and 'Beyond' Technique is an approach to correct the dysfunction of intra-articular spaces.

- This approach thereby facilitates transcription of foot-ground forces which are transcribed up the leg to the sacral joint spaces for re-distribution.

The joint spaces of sacrum are treated to accommodate these forces.

- There is less force within the sacral joint spaces because there is no acceleration.
- The transcription of forces in sitting is similar to the transcription of forces during standing
- as compared to the forces during ambulation and running which are characterized by increased amplitude of force as the result of acceleration.

The transcription of these sacrum forces,

and ground forces, during sitting has less erosion capacity because the displacement forces on three planes are not as intense.

- These forces are transcribed through the body's intra-articular spaces.
- There is an accommodation to these forces within the sacral joint spaces which are then distributed throughout the body.

What is the character of "transcription of forces?"

There is a particle and a wave motion of energy which displaces fluids, similar to the displacement of ocean water when the energy of the wind is transcribed on the water towards the shore.

- This particle and wave-like motion of energy from foot-ground forces and from sacrum ground contact (i.e., in sitting) requires only space.
- The fluid, as a medium of transcription, will be more accommodating if it is less viscous and less dense.
- The more the fluid within the joint spaces is of similar density to water, the more normal the transcription of forces through this medium of fluid can occur.

Muscle Energy and 'Beyond' Technique: An Approach to Treatment of Intra-Articular Joint Spaces for Energy Distribution and Vertical Dimension

These three concepts are equally important, although there are variables of significance for different clients.

Joint Mobility

The joint mobility of the joint surfaces of any joint is important for movement of that joint.

Ranges of motion occur on three planes:

- sagittal
- coronal
- transverse

- Flexion and extension are uni-directional sagittal plane movements.
- Abduction and adduction are uni-directional coronal plane movements.
- External and Internal rotations are uni-directional transverse plane movements.
- Horizontal abduction and horizontal adduction of the glenohumeral joint are also uni-directional movement on a transverse plane,

- The glides of the joint surfaces affect joint mobility.
- These glides occur because of the pushes and the pulls of muscle fibers which attach to the bones.
- There are approximations which occur at joint surfaces,
- distractions, that are the result of mechanical pushes and pulls on the joint surface,

Palpation of joint Mobility

It is important to focus on active and passive physiologic ranges of motion as they pertain to joint surface mobility.

- Perform "assisted active“ ranges of motion while palpating accessory joint mobility close to the joint surface of the moving surface.
- **For example**, during assisted active shoulder abduction, palpate for smooth caudal glide of the humeral head in the glenoid fossa.

Accessory Motions:

Glides When the moving surface is convex with the stable and fixed non-moving surface concave For example the glenohumeral joint, the accessory glides are as follows:

Flexion: Posterior glide

Extension: Anterior glide

Abduction: Caudal glide

Adduction: Superior glide

External rotation around a vertical axis:

- Anterior glide with distraction

Internal rotation around a vertical axis:

- Posterior glide with distraction

Horizontal Abduction:

- Anterior glide with approximation

Horizontal Adduction:

- Posterior glide with approximation

Articular Balance

Articular balance is the relationship of the two articulating joint surfaces from anatomical neutral throughout a full physiologic movement.

Articular balance will be viewed from a non physiologic observation,

For example:

when there is a caudal subluxation of the humeral head in the glenoid fossa, secondary to excessive tone of the latissimus dorsi which depresses the humeral head;

- When there is faulty articular balance,

  the two articulating joint surfaces do not maintain normal relationship throughout the range of physiologic movement, resulting in limitations of passive and active ranges of motion.
- The joint mobility may not be affected, i.e., there may be full glides attained with mobility testing.
- Long term problems of articular balance at a joint typically result in capsular tensions which result in joint hypomobility.
- It is thus common to discover both joint mobility dysfunction as well as articular balance dysfunction when there are joint problems.

- Ligaments are connective tissue.

Histologic assessment has discovered different ligament fiber types.

- One type of fiber appears to be ***longitudinal***, while another type appears to be ***horizontal***.
- The horizontal or longitudinal orientation of the fibers of the ligaments appears to play an important role.

The author hypothesizes, from evidence during clinical research studies, that the ***longitudinal fibers*** are for ***guidance and direction*** of the distal bone to which the ligament is attached.

The ***horizontal fibers*** of the ligaments appear to connect the two neighboring bones, in order to provide ***feedback for proprioception*** as to whether the two bones are working together in a appropriate manner during resting state and during dynamic motion.

- The instability of a joint with ligamentous problems may be more severe for a person than joint hypomobility problems secondary to capsule dysfunction.
- Both the direction of the moving part, as well as the coordinated activity of the attached two bones will likely be affected with ligament tension problems.
- This causes instability which may pre-dispose a person more often to injury.

Intra-articular Space and Vertical Dimension

This is a unique concept which is under clinical investigation by Lowen and Giammatteo

- regarding the system of intra-articular spaces.
- The affected system of intra-articular spaces apparently underlies all joint problems, and repercussions associated with dysfunctional

intra-articular spaces include capsule dysfunction as well as ligamentous problems.

- **Capsule problems cause joint hypomobility. Ligamentous dysfunction causes loss of articular balance of the joint surfaces.**

- The spaces within the joints are maintained with energy that has a vibrational molecular particle motion.
- This energy is entrapped within the fluid of the spaces.
- When the fluid becomes excessively viscous and dense, the energy does not circulate through the system of intra-articular spaces.
- The entrapped energy within the intra-articular space will be free for exit and entry as long as there is fluid.
- This fluid is the synovial fluid within the joint space, which interfaces with the matrix of the connective tissue.

- When there are increases in the density of this fluid,
- proteins,
- long chain fatty acids,
- toxins

will be trapped inside the joint spaces, as the interstitium is affected.

- This increase in density affects the metabolism, which includes passage of nutrients into the cells, and also delivery of waste products, including proteins, long chain fatty acid, and toxins from the cells into the lymph capillaries.

- This transport of waste products will be dysfunctional when there is increased viscosity of the fluids.
- There are lymph nodes in each joint space of each peripheral joint to ensure that the lymph load of waste products is purified,
- so that these joint spaces are only filled with pure soluble fluid and energy.
- When there is dysfunction of the intra-articular space, the total system of energy flow through the body's joint spaces is affected.

Treatment of Biomechanical Dysfunction ;

Treatment of Joint Hypomobility

- Today there is a recognition of multiple joint mobilization protocols.
- These procedures were developed by many different professionals, including

  Stanley Paris, Freddy Kaltenborn, John Mennell, Geoffrey Maitland ,Brain Mulligan and others who developed musculoskeletal techniques for increasing joint mobility.
- These approaches were developed to address intra-capsular as well as ligamentous dysfunction. "Capsular patterns“ were recognized by professionals who observed consistent variables in their clients‘ typical manifestation of joint dysfunctions.

- These mobilization techniques are being used today, and benefit clients with dysfunctions of the capsule, especially when there are adhesions of elasto-collagenous fibers.
- These direct stretch-like methods are also effective to address intra-articular adhesions.
- Yet the field of manual therapy is moving towards less direct approaches, looking for decreased resistance from body tissues.
- Because joint mobility problems are dysfunctions of the capsule, which are fascial problems,

fascial release techniques are particularly effective and efficient.

- The **Soft Tissue Myofascial Release Technique**, developed by Weiselfish Giammatteo, will correct the majority of problems which are fascial restrictions affecting joint mobility secondary to extra-articular dysfunction.
- When the joint mobility is compromised because of muscle tension of the sarcomere, i.e., protective muscle spasm,

there is a remarkable approach for intervention:

Strain and Counterstrain Technique.

Treatment of Articular Balance Dysfunction

- Articular balance is the relationship between two articular surfaces of a joint throughout a full physiologic range of motion.
- This would be secondary to severe hypertonicity of the muscle fibers attached to the bones of that joint, or due to significant extra-articular or articular fascial restrictions.
- These articular fascial restrictions may be capsule or ligament.

- The ligaments are "special." Rather than being totally affected by facial release techniques,

  there are other methods for release of ligament tensions.
- Another interesting phenomenon is the longitudinal ligament fibers appear to be

  responsible for "direction" of movement.
- The longitudinal fibers are considered by the author as the Guidance Systemc.

- In comparison horizontal fibers are apparently the coordinators of motion between the two bony surfaces which they co-join.
- Coordination appears to be a major function of these horizontal ligament fibers;
- they coordinate the activities of neighboring bones.

The approach for release of ligamentous tension for guidance and coordination of joints,

and for improved articular balance, is ligament fiber therapy.

Treatment of Decreased Vertical Dimension of Intra-articular Spaces

- This problem, when it affects one joint, affects all the joints of that extremity.
- Also, when the energy flow is affected in the extremity, total body flow of energy through the intra-articular spaces is compromised.
- The 3-planar approach for correction of the dysfunctional joint space is
- Muscle Energy and 'Beyond' Technique, developed by Weiselfish-Giammatteo.

- This treatment approach considers the plane of presentation;
- A "positional diagnosis" is determined; a "treatment position" is assumed to address this presentation;
- and the treatment technique is performed.
- The vertical dimension within the joint space can be restored so that ranges of motion are increased.