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Pilates
Introduction to Rehabilitation

This course is designed to introduce the concept of Pilates as a corrective exercise method working with postural issues in an effort to reduce risk of injury and also when injuries happen to be used in partnership as a rehabilitation technique.

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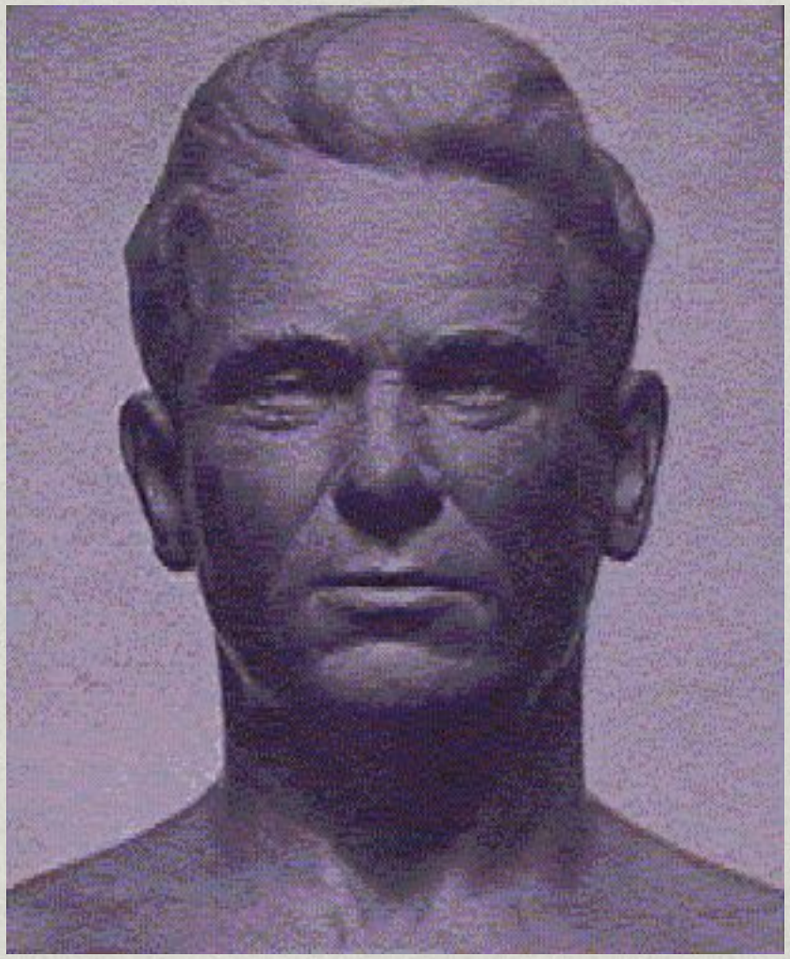
Joseph PIlates was not a medical professional and when people would come into his studio with an injury , such as a knee problem he would say



“lets forget about the knee and worry about the rest of the body”

Its this approach we must keep to ensure the traditional approach of the method.

We are not healers, therapists we are Pilates Instructors.

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Pilates has changed today from its origin, not only in the many variations of modifications available today but also how and where today it is being taught.

Today you will find Pilates being used by physiotherapists in the work of rehabilitation with patients and often these clients are passed onto to a Pilates Instructor to continue the previous
work done by the medical professional.

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A Pilates instructor , unless you are a trained medical professional are not able to diagnose a injury and it is vital that correct information be collected to design a suitable programme.

Often the client comes with information from their medical professional but sometimes it need the PIlates instructor to get the information themselves from the medical professional to be able to design an effective programme.

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It is at this point with information we design a programme for the clients needs and we also need to understand injury to be able to give appropriate guidance to our clients.

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THERE ARE TWO BASIC DIFFERENT CLIENT TYPES

ACTIVE AND NON ACTIVE

THE ACTIVE CLIENT MIGHT HAVE SOME HAVE SPORTS RELATED INJURY PROFESSIONAL OR AMATEUR BASED PROBLEM

Injuries in active clients are inevitable,

Some are temporary and heal after a period of rest.

As Pilates is a non intrusive method it is ideal for healing and also preventing injuries through strengthening and lengthening the muscles

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What is an injury ?

Occurs when there is a change in the nature of the tissue in the body.

This may be caused by a breakdown or disruption of tissue, or by the muscles being overloaded.

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Factors to consider

- What tissue is involved ?

- Mechanism of the injury and factors caused the injury

- Rate of onset of the injury

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What tissues are involved ?

The easiest way to define the involved tissue is to determine if the injury is of a soft tissue nature. (affecting muscles, tendons or ligaments) or affecting bones.

The majority of sports injuries are soft.

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Immediate Treatment

- Visit a medical practitioner for diagnosis of the symptoms.

- Follow a specific treatment plan

- Follow a comprehensive (long term) rehabilitation programme to encourage a return to normal strength

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Types of Injuries

Primary Injuries

They are usually caused by a collision or muscle tears, or through over use or friction to the muscle or tendon.

Secondary Injuries

Occur at a site away from the primary injury and also they can occur if the previous injury has been mismanaged or the return to sport too soon.

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Rate of onset of injury

An injury may occur at a single event.

This tends to apply to acute injuries

If the injury lasts for more than six weeks the injury is defined is defined as chronic

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How the injury heals

Acute Phase

This phase follows the first 72 hours of an injury and usually involves pain, swelling, redness heat and loss of function.

RICE
Rest: Ice:Compression: Elevation

No Exercise !

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Repair phase

The repair phase takes place over a period of three days to six weeks. It is important to maintain a pain -free range of motion during this stage of rehabilitation.

Remodelling Phase

The final healing phase takes place over a period of six weeks to several months. As the damaged tissue gradually rebuilds strength and ability there is less stress on the scar tissue which allows it to heal.

Taking Time

The amount of time your body takes to heal from an injury, depends on the severity and location of the injury

Muscles：Six weeks to heal

Tendons/Ligaments：Twelve Weeks

Bones/Joints：Six to Twelve weeks to heal

CASE STUDIES

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THE SPINE

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Lumbar Spine Biomechanics

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Physiological Movements

- Flexion
- Extension
- Lateral Flexion
- Rotation

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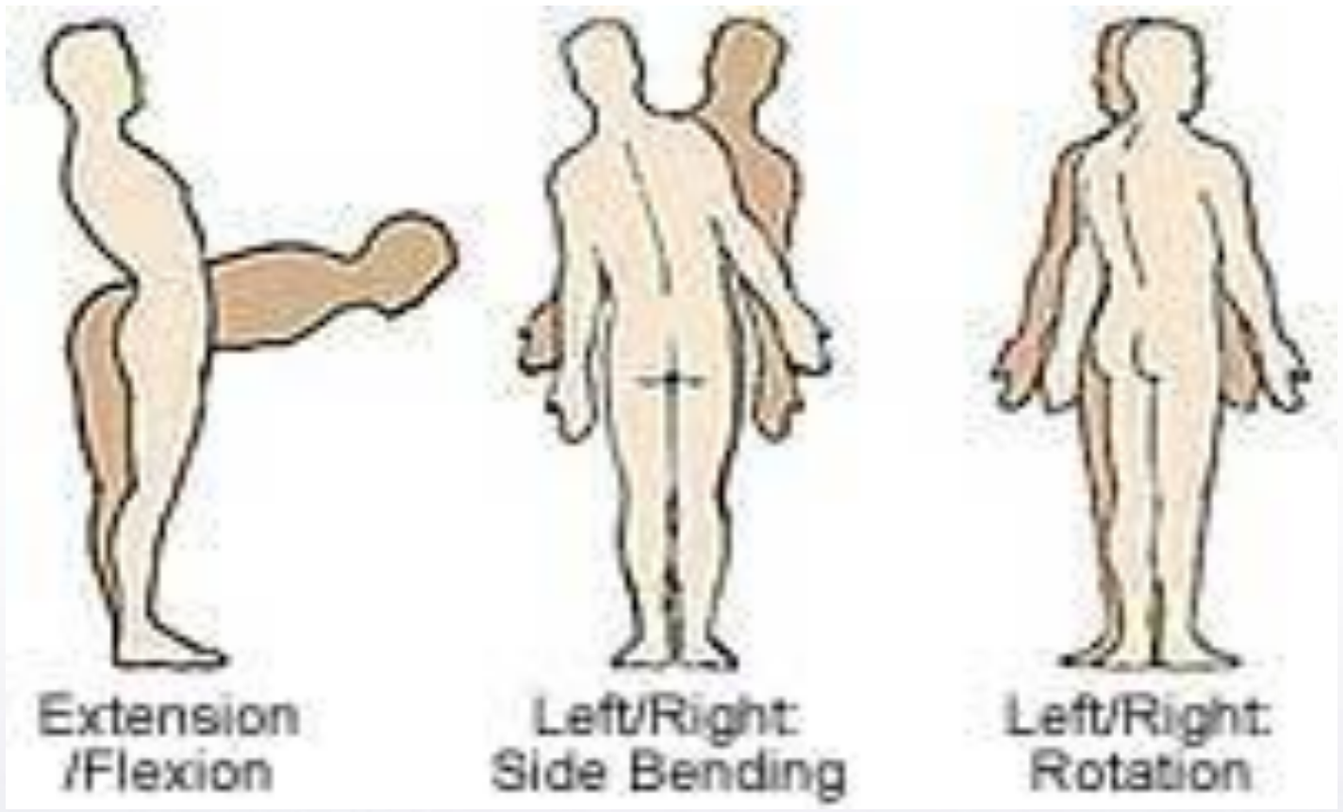
Extension
/Flexion
Left/Right:
Side Bending
Left/Right:
Rotation

Flexion/Extension

- 4 degrees upper Thoracic
- 6 degrees mid Thoracic
- 12 degrees low Thoracic
- Increasing by 1 degree at each lumbar segment
- Lumbar sacral junction 20 degrees
-

- White and Panjabi

Flexion

- Normal lumbar range 55 degrees
- In standing -most common activity
- Stages-

1. Post sway of hips (keeps COG in base of support) as hips flex
2. Posterior pelvic tilt
3. Reverse lumbar curve
4. Finish with more hip flexion

- Sahrmann

Flexion

- No more than 50 % of lumbar flexion should occur before hip flexion is initiated
- At completion of flexion lumbar spine flat rather than kyphosed (consequences!!)
- Starting position is in 20 to 30 degrees extension
- Consider consequences if starting with a flat back posture!

Sahrmann

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Flexion

- In maximum flexion Erector spinae relaxed
- therefore stress on posterior elements
- (ligaments/muscles)
- 20 degrees sustained stretch increases range by 5 degrees (creep of tissues)
- 2 minutes for 50% return
- 30 minutes full return

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Flexion impairments

- Final lumbar flexion position more than 30 degrees is excessive
- Greater than 50% lumbar flexion before hip flexion
- Low back pain subjects move more at lumbar than hips in 30 to 60 degree range
- Excessive backward sway at ankles (sway back postures)

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Return from Flexion

- Hip extension first then combined hip/lumbar

- Impairment

- (if not get increased compression force of spine)

- Exaggerated forward sway of hips especially with sway back postures

Extension

- Increase in lordosis
- Maximum 50 degrees
- Muscles that resist movement are on anterior abdominal wall …NOT on anterior spine
- Decreases width of spinal canal

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Extension Impairments

- Extension focused at only 1 or 2 segments
- Because no muscles close to the front of the spine movement primarily resisted but discs and ligaments
- In disc degeneration anterior longitudinal ligament less taut therefore.less restriction to extension

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Lateral Flexion

- 75 degrees potential but limited by ribcage
- 3/4 thoracic and 1/4 lumbar
- 8 to 9 degrees low Thoracic
- 6 degrees Lumbar
- 3 degrees lumbosacral junction

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Lateral Flexion Impairments

- Rotated spine - lateral flexion limited to that side
- Non -segmental

Rotation

- 13 degrees
- (2 degrees each segment from T10 to L5)
- L5/S1….. 5 degrees
- Not prime movement ..Thoracic spine more able to rotate
- More rotation in sitting with Lumbar flexion

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Rotation Impairments

- 31/2 degrees rotation is enough to strain annulus (sitting bending and rotating)
- Sports-golf.squash, netball
- (tennis ,volleyball less strain as feet not fixed at time of rotation--whole body follow through

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The spine can bend sideways
The spine can bend forwards
The spine can twist
The spine can bend and twist at the same time

Translation Movements

- Accompanies the physiological movements
- (anterior with flexion, post with extension)
- Shear forces
- More likely to produce damage to tissues
- More likely to produce instability

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Translation Impairments

- Excessive Anterior Shear. Psoas
- Can lead to instabilities
- Narrow spinal canal during extension

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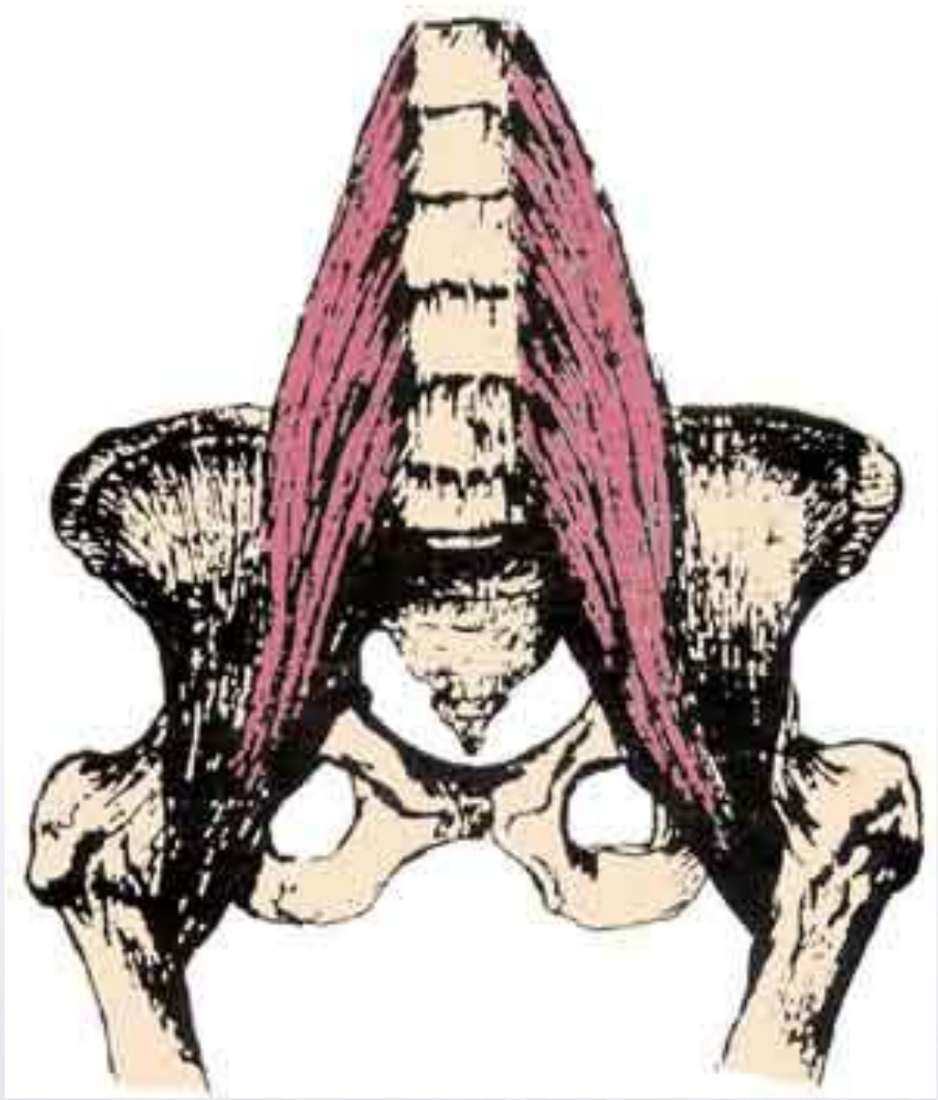
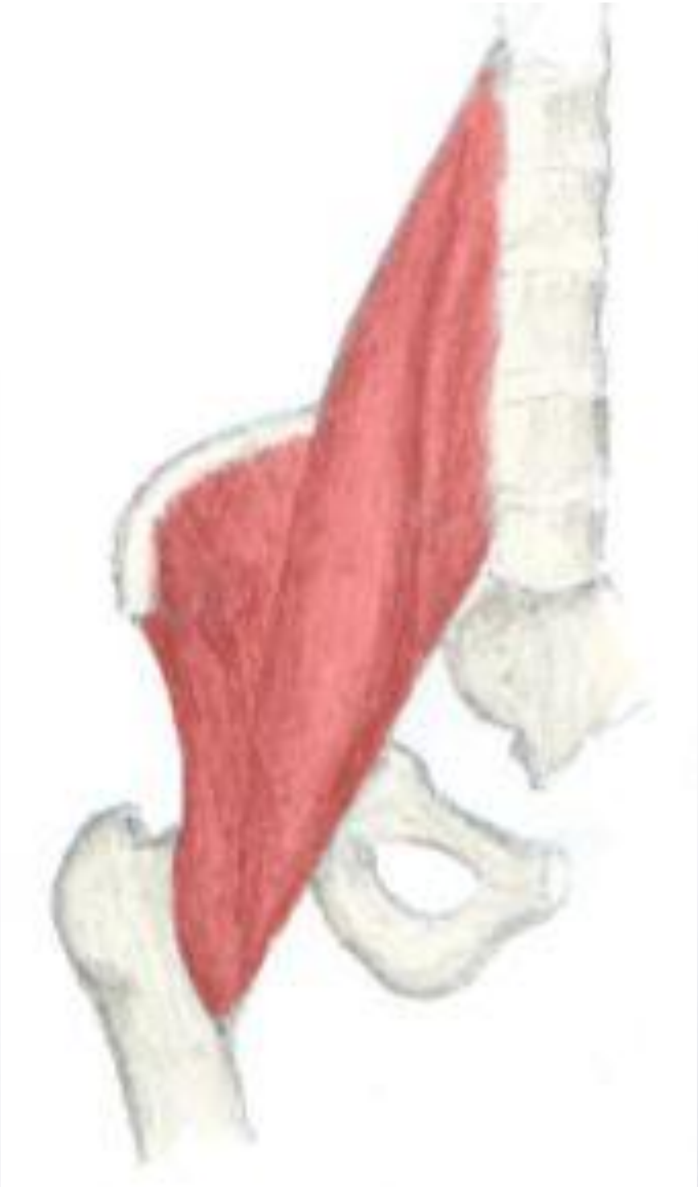
Psoas



Iliopsoas



- Only need 2 to 3% maximum voluntary contraction (MVC) of abdominals for stabilising spine in upright posture (Cholewicki)

- or 20-30% (Hodges, Mackenzie Hyde)

- Sit-ups…68% rectus abdominis (RA)

- …19% external oblique) (EO)

- …14% internal oblique (IO)

- Juker

Weak Abdominals

- Rotation not controlled
- Excessive anterior tilt of pelvis during lower limb movements

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Short stiff abdominals

- Increased post pelvic tilt
- Increased lumbar flexion strain

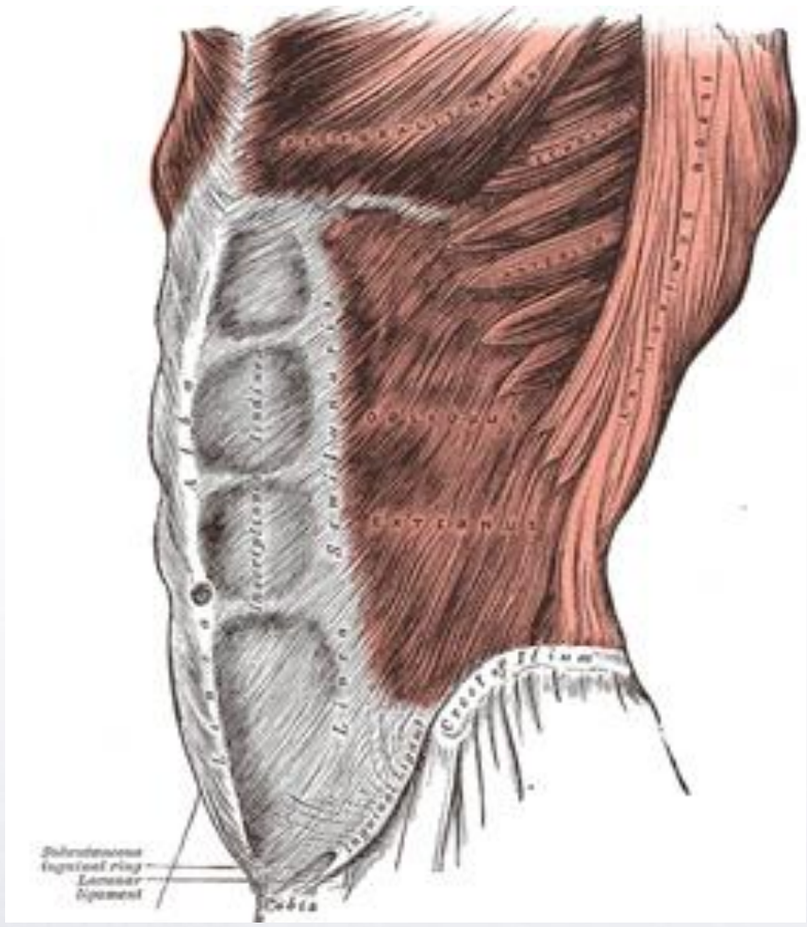
Abdominal impairments

- WEAK
- Rot not controlled
- Excessive post ant pelvic tilt especially during lower limb movements

STIFF AND SHORT

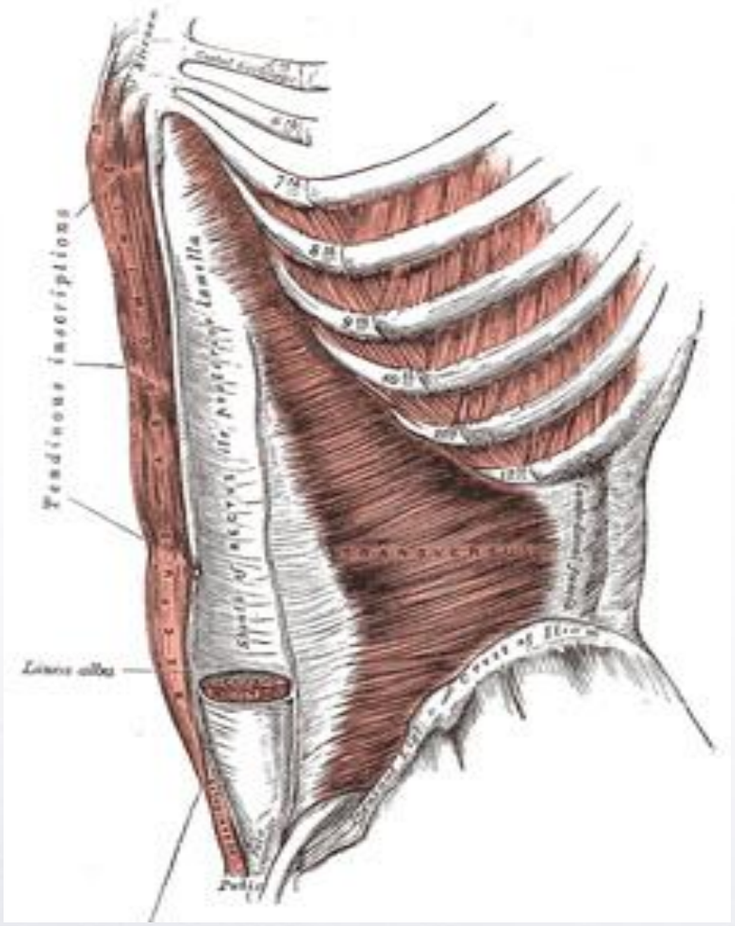
- Increased post pelvic tilt
- Increased lumbar flexion strain

Rectus Abdominus



- Cannot control/prevent rotation
- If short leads to increased thoracic kyphosis

External Oblique



- Origin-External surface ribs 5 to 12

- Insertion-abdominal aponeurosis and linea alba,inguinal ligament ,ASIS and pubic tubercle

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External Oblique

- Working bilaterally
- Flexes lumbar spine
- Posterior pelvic tilt (most effective muscle)
- Working unilaterally
- Lateral pelvic tilt
- Trunk rotation (works with opposite internal oblique)

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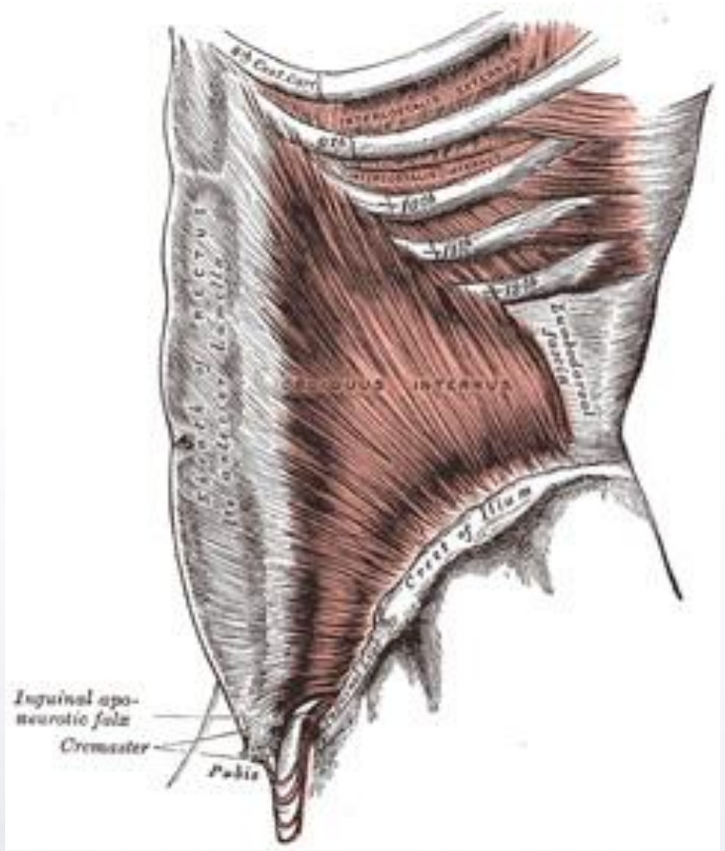
External Oblique (EO)

- Before doing strong hip flexion work should be able to lie supine with legs extended with no back pain
- EO will counteract ant tilt pull of hip flexors
-

External Oblique

- Connects with Serratus anterior and latissimus dorsi
- Therefore works with push-ups (plank)

Internal Oblique



- ORIGIN-inguinal ligament ,iliac crest, TL fascia

- Insertion -linea alba ,crest of pubis,lower 3 ribs

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Trunk Curl (Head Up)

- Can overdevelop IO and RA
- Check they have enough flexibility
- Have they got enough post pelvic tilt
- (are hip flexors short?)
- Can they initiate with post pelvic tilt
- If increased Thoracic kyphosis check not increasing this
- Can they maintain curl?
- Feet not lifting and not pushing too hard in to floor
- Harder for men (distribution of body mass)
  - Kendall Schumann

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Internal Oblique

- Bilaterally
- Upper Trunk flexion
- Support and compress abdominal contents
- Depress Thorax Unilaterally
- Rotation of spine (with opposite external oblique
- Lateral flexion

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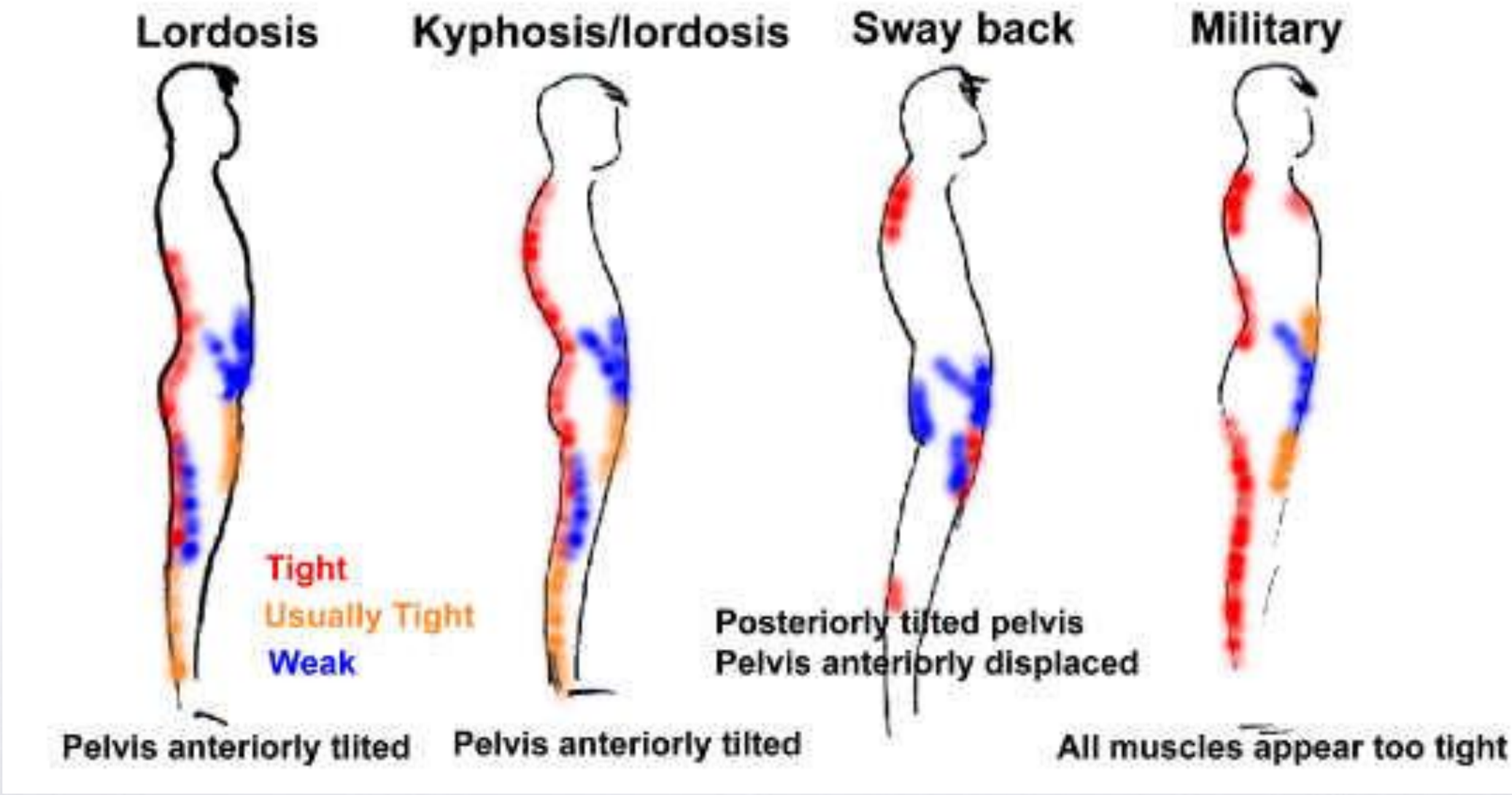
Postures



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Spine Injuries

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VERTEBRAE - THE BONES OF THE VERTEBRAL COLUMN (SPINE OR BACKBONE) THAT SUPPORT THE BODY ARE CALLED THORACIC AND LUMBAR VERTEBRAE.

THE 12 VERTEBRAE BELOW THE NECK ARE IN THE THORACIC SECTION IDENTIFIED AS T1 THROUGH T12. THE THORACIC SECTION IS IN THE AREA OF THE RIB CAGE.

THE FIVE VERTEBRAE IN THE LUMBAR SECTION ARE BELOW THE THORACIC SECTION IDENTIFIED AS L1 THROUGH L5. THE LUMBAR SECTION IS IN THE AREA OF THE WAIST.

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THE PELVIC SECTION IN THE AREA OF THE HIPS AND TAILBONE WILL NOT BE DISCUSSED HERE BECAUSE DEGENERATIVE DISC DISEASE OCCURS LESS FREQUENTLY IN THESE AREAS.

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A BROKEN BACK MEANS ONE OR MORE OF THE VERTEBRAE HAS BEEN BROKEN OR CRACKED.

EACH VERTEBRA HAS A HOLE IN THE MIDDLE CALLED THE spinal canal THROUGH WHICH THE SPINAL CORD PASSES FROM THE BRAIN DOWN THE FULL LENGTH OF THE SPINE.

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NERVE BRANCHES CALLED NERVE ROOTS EXIT THE SPINAL CORD ON EITHER SIDE NEAR THE POSTERIOR (BACK) OF THE SPINE AND CONTINUE TO ADJACENT AREAS OF THE BODY.

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ON THE TOP AND BOTTOM OF THE VERTEBRA, IN CONTACT WITH THE DISCS, ARE CARTILAGINOUS END PLATES.

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THESE SURFACES CAN DEGENERATE WITH FISSURES (CRACKS) THAT REGENERATE OR HEAL WITH CHONDROCYTES (CARTILAGE CELLS) AND GRANULATION TISSUE (NEW CONNECTIVE TISSUE AND TINY BLOOD VESSELS THAT FORM ON THE SURFACES OF A WOUND DURING THE HEALING PROCESS).

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POSTERIOR PROTRUSIONS FROM THE VERTEBRA CALLED THE SPINOUS PROCESSES PROVIDE STRUCTURES FOR THE ATTACHMENT OF TENDONS AND MUSCLES THAT CONTROL MOVEMENT OF THE BACK.

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THE TWO MAJOR WING-LIKE PROTRUSIONS ON EITHER SIDE ARE CALLED THE TRANSVERSE PROCESSES THAT ALSO ALLOW FOR THE ATTACHMENT OF LIGAMENTS AND TENDONS.

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THERE ARE FOUR OTHER PROTRUSIONS MIDWAY BETWEEN THE POSTERIOR AND THE SIDE PROTRUSIONS. THESE CONTAIN FACET JOINTS THAT MATE WITH THE ADJACENT VERTEBRA. THE UPPER FACET PROTRUSIONS ARE CALL THE SUPERIOR ARTICULAR PROCESSES, AND THE LOWER ARE CALLED THE INFERIOR ARTICULAR PROCESSES.

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Lower Back Pain

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VERTEBRAL PATHOLOGY CAN ONLY BE DIAGNOSED USING A STANDARD X-RAY, MAGNETIC RESONANT IMAGING (MRI), OR OTHER SCANNING METHODS.

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Fractures -
The vertebrae are bones that can fracture. Medical treatment is strongly recommended for fractures.

The treatment may involve immobilization of the back until the bone has healed.

Other measures must be taken in extreme cases.

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Bone Spurs -

THE VERTEBRAE CAN DEVELOP ABNORMAL GROWTHS CALLED BONE SPURS THAT IMPINGE NERVES, LIGAMENTS, OR THE ADJACENT VERTEBRAE, CAUSING PAIN.

EXCESS CALCIUM CONSUMPTION AND SUPPLEMENTATION ARE THE PRIMARY CAUSES OF BONE SPURS, ESPECIALLY WHEN THE DIET IS DEFICIENT IN MAGNESIUM.

THE TREATMENT FOR BONE SPURS IS SURGICAL REMOVAL.

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Misalignment -

VERTEBRAL DISCS CAN TEAR AWAY FROM THE ADJACENT VERTEBRAE CAUSING A MISALIGNMENT.

MEDICAL TREATMENT MAY INCLUDE REALIGNMENT AND IMMOBILIZATION OF THE BACK UNTIL REATTACHMENT BY NATURAL HEALING HAS OCCURRED.

PINCHED NERVE ROOTS CAN CAUSE THE MUSCLES TO PULL AND HOLD THE SPINE IN A CONDITION OF CONSTANT MISALIGNMENT IN AN ATTEMPT TO RELIEVE THE PAIN.

THESE MUSCLES CAN QUICKLY BECOME CRAMPED AND PAINFUL THEMSELVES.

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Discs - THE DISCS THAT SEPARATE THE VERTEBRAE ARE BASICALLY ROUND WITH A FLAT SURFACE ON THE TOP AND BOTTOM.

EACH DISC HAS A GELATINOUS CENTER CALLED THE NUCLEUS PULPOSUS, SURROUNDED BY THE ANULUS FIBROSUS.

THE SEMI-LIQUID GEL IN THE CENTER ALLOWS THE DISC TO BETTER ABSORB SHOCK LOADS AND TO TILT, FORMING A WEDGE SHAPE DURING THE MOVEMENT OF THE BACK.

THE ANULUS FIBROSUS GRADUALLY BECOMES MORE DENSE AND STRONGER.

CHANGES IN THE COMPOSITION OF THE DISC ARE GRADUAL THE DISC IS COMPOSED OF PROTEIN COLLAGEN AND PROTEOGLYCANS

A NORMAL DISC IS 80% WATER HELD WITHIN THE CELLS.

A REDUCTION IN THE AMOUNT OF WATER RESULTS IN A THINNING OF THE DISC.

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EACH DISC IS RIGIDLY ATTACHED BY FIBERS TO THE ADJACENT VERTEBRAE ON THE TOP AND BOTTOM ALONG THE OUTER EDGE CALLED THE EPIPHYSEAL RING.

THE DISC IS ALSO CONNECTED TO ANTERIOR (FRONT SIDE) AND POSTERIOR (BACK SIDE) LONGITUDINAL LIGAMENTS.

THE DISCS ARE LOCATED BETWEEN THE VERTEBRA IN FRONT OF THE SPINAL CANAL.

THE DISCS DO NOT SLIP OR SLIDE ON THE VERTEBRAE AS MANY PEOPLE BELIEVE

EACH DISC GROWS AND ADHERES TIGHTLY TO THE ADJACENT VERTEBRA ON TOP AND BOTTOM AND HAS A STRONG, FIBROUS OUTER BODY THAT CAN SUFFER FROM HERNIAS (BULGES), FISSURES (TEARS OR CRACKS), AND TOTAL RUPTURE (EXTRUSION OF THE NUCLEUS PULPOSUS IN WHICH THE GELATINOUS CENTER IS SQUEEZED OUT).

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DEGENERATIVE DISC DISEASE OF THE BACK IS MOST LIKELY TO OCCUR IN THE LUMBAR SECTION, WHERE THE VERTEBRAE ARE IDENTIFIED AS L1 THROUGH L5.

THE FOLLOWING ARE SOME OF THE TYPICAL PROBLEMS THAT OCCUR IN THIS AREA.

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Thinning - THE VERTEBRAL DISCS CAN BECOME THINNER BY DESICCATION (WATER LOSS), CATABOLISM (DEVOURING ONESELF) OF THE COLLAGEN BY THE BODY, POOR POSTURE, POOR WORKING ENVIRONMENT, IMPROPER BED, HEAVY HEAD GEAR, AND/OR POOR DIET.

UNLESS IT IS SEVERE, THE THINNING OF THE DISC MAY NOT PRODUCE ANY SYMPTOMS, BUT THIS THINNING REDUCES THE SPACING BETWEEN THE VERTEBRAE.

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THINNING DISCS CAN CAUSE MISALIGNMENT OF THE VERTEBRAE AND FACET JOINTS, PINCHED NERVES, STRESSED LIGAMENTS, MUSCLE TENSION, CRAMPS OR SPASMS, AND THE ABRASION OF ADJACENT VERTEBRAE, THEREBY CAUSING PAIN.

IN EXTREME CASES, THE ENTIRE DISC VIRTUALLY DISAPPEARS, CAUSING THE ADJACENT VERTEBRAE TO FUSE OR GROW TOGETHER.

DISC THINNING CAN BE DIAGNOSED USING A STANDARD X-RAY, MRI, OR OTHER SCANNING METHODS.

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Herniated DisC - HERNIATION OF THE DISC OCCURS WHEN THE OUTER FIBROUS BAND BEGINS TO BULGE OUTWARD, A CONDITION SOMETIMES REFERRED TO IN THE PAST AS A “SLIPPED DISC”

IN REALITY THE DISC HAS NOT SLIPPED OUT OF PLACE. THE BULGE OF THE HERNIATED DISC CAN IMPINGE ON OR COMPRESSES THE SPINAL CORD, CAUSING PAIN.

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SURGERY MAY INCLUDE REMOVAL OF THE BULGING AREA TO RELIEVE THE IMPINGEMENT OF THE AREA BUT THE PROBLEM WILL THEM TRANSFER

THE PROGRAM PRESENTED HERE CAN ALSO REDUCE THE HERNIATION AND RELIEVE SYMPTOMS.

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A HERNIATED DISC CAN BE CAUSED BY POOR POSTURE, POOR WORKING ENVIRONMENT, IMPROPER BED, HEAVY HEAD GEAR, SHOCK LOADS, AND/OR POOR DIET.

DISC HERNIATION CAN BE DIAGNOSED USING AN MRI OR OTHER SCANNING METHODS, BUT NOT BY A STANDARD X-RAY.

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Ruptured Disc - A RUPTURE OF THE DISC OCCURS WHEN THE HERNIATION CONTINUES UNTIL THE GEL (NUCLEUS PULPOSUS) IN THE CENTER OF THE DISC IS EXTRUDED OUT OF A CRACK IN THE DISC AT THE HERNIATION.

THE EXTRUSION OF THE NUCLEUS PULPOSUS IS SOMETIMES CALLED THE "SQUEEZED TOOTHPASTE" EFFECT. THE EXTRUDED NUCLEUS PULPOSUS CAN IMPINGE ON THE SPINAL CORD AND/OR THE NERVE ROOTS CAUSING SEVERE PAIN.

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SPINAL CORD NERVE DAMAGE CAN CAUSE PAIN AND TINGLING IN DISTANT PARTS OF THE BODY BELOW THE DAMAGE POINT AS FAR AWAY AS THE LEGS, FEET, AND TOES.

YOU RESTORE THE DISC GEL BACK TO THE CENTER OF THE DISC.

ONCE THE NUCLEUS PULPOSUS HAS BEEN EXTRUDED FROM THE DISC IT MUST BE SURGICALLY REMOVED IN ORDER TO RELIEVE SYMPTOMS.

DISC RUPTURE CAN BE DIAGNOSED USING AN MRI OR OTHER SCANNING METHODS BUT NOT BY A STANDARD X-RAY.

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IMMEDIATE SURGERY SHOULD BE UNDERTAKEN WITHIN A FEW DAYS TO RELIEVE THE IMPINGEMENT ON THE SPINAL CORD BECAUSE IT CAN CAUSE PERMANENT NERVE DAMAGE.

INSIST ON AN MRI SCAN IF YOU HAVE THE SLIGHTEST SUSPICION OF A DISC RUPTURE.

DO NOT DEPEND ON SIMPLE MUSCLE TESTS

A DELAY IN SURGERY CAN RESULT IN A PERMANENT LIFETIME DISABILITY AS MANY SUFFERERS HAVE SADLY DISCOVERED.

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Facet Joints - THE FACET JOINTS ARE CONTACT JOINTS BETWEEN VERTEBRAE.

THE CERVICAL VERTEBRAE HAVE WING-LIKE PROTRUSIONS THAT CONTAIN THE FACET JOINTS AT THE ENDS.

THE SLIDING SURFACES OF THE JOINTS CAN BECOME DAMAGED FROM OSTEOARTHRITIS OR RHEUMATOID ARTHRITIS.

A PILATES PROGRAM GENTLY PULLS THE JOINT APART TO ALLOW NOURISHMENT AND HEALING AND CAN ALSO CALM THE AUTOIMMUNE SYSTEM ATTACK THAT CAUSES INFLAMMATION IN ARTHRITIC JOINTS.

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Ligaments - THE FACET JOINTS ARE SURROUNDED BY LIGAMENTS THAT ALLOW MOVEMENT OF THE JOINT BUT RESTRICT THE DEGREE OF MOVEMENT.

LIGAMENTS ALSO SPAN FROM VERTEBRA TO VERTEBRA TO SURROUND THE DISC AND KEEP THE BONES IN PROPER ALIGNMENT.

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THESE LIGAMENTS CAN BECOME TORN OR STRAINED CAUSING PAIN.

THE PREFERRED TREATMENT IS A RESTRICTION IN THE LOAD AND MOVEMENT TO ALLOW NORMAL HEALING.

REALIGNMENT OF THE SPINE IS ALSO ESSENTIAL

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Muscles and Tendons -

THE ENTIRE AREA OF THE BACK IS A MASS OF MUSCLES AND TENDONS WHICH PROVIDE CONTROL AND STRENGTH.

THESE MUSCLES AND TENDONS CAN BECOME TORN OR STRAINED RESULTING IN PAIN.

THE PREFERRED TREATMENT IS A RESTRICTION IN THE LOAD AND MOVEMENT TO ALLOW NORMAL HEALING.

THE PILATES PROGRAM PROMOTES THE HEALING OF TORN MUSCLES AND TENDONS, AND IT WILL KEEP HEALTHY MUSCLES AND TENDONS FLEXIBLE FOR OPTIMUM HEALTH AND STRENGTH.

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PROGRAMME

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- NON-SURGICAL PROCEDURES
- CONTROL YOUR PAIN BEFORE STARTING OTHER THERAPIES.

- REST FOR A DAY OR TWO, BUT NO LONGER.

- STRETCHING OUT ON THE FLOOR WITH YOUR KNEES BENT AND LEGS ELEVATED CAN HELP.

AVOID BENDING, LIFTING AND SITTING IN ONE POSITION.

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- **2 TAKE THE PAIN MEDS YOUR DOCTOR PRESCRIBES OR RECOMMENDS.**
- **PAIN RELIEVERS CAN RELIEVE PAIN AND REDUCE SWELLING AND INFLAMMATION.**
- **YOUR PHYSICIAN MAY PRESCRIBE MUSCLE RELAXERS OR ANTIDEPRESSANTS TO AID WITH PAIN.**

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- **USE COLD AND HEAT THERAPY.**
- **COLD THERAPY SHOULD BE USED FOR THE FIRST 48 HOURS.**
- **USE AND ICE PACK OR BAG OF FROZEN VEGETABLES WRAPPED IN A TOWEL FOR AT LEAST 15 MINUTES SEVERAL TIMES A DAY.**

HEAT THERAPY, SUCH AS A HEAT LAMP, HEATING PAD OR HEAT PACK CAN BE USED AFTER THE SECOND DAY, BUT YOU MAY FIND THAT COLD THERAPY PRODUCES BETTER RESULTS.

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WEAR A BRACE TO HELP RESTORE STABILITY AND MAKE YOU MORE COMFORTABLE. BRACES ARE ONLY USED FOR A SHORT PERIOD OF TIME, AND YOU MUST DO STRENGTHENING EXERCISES REGARDLESS AS BRACES CAN WEAKEN THE MUSCLES THAT NEED TO BE STRONG TO SUPPORT THE SPINE.

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- **START EXERCISE THERAPY AS SOON AS YOU CAN MANAGE YOUR PAIN.**

- **EXERCISE IS THE MOST IMPORTANT PART OF RECOVERY AND PREVENTION.**

- **YOUR MEDICAL PROFESSIONAL OR YOU PILATES INSTRUCTOR CAN TEACH YOU THE PROPER TECHNIQUES AND WORK WITH YOU TO DEVELOP A DAILY EXERCISE PLAN**

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- **WALKING AND STRETCHING AND PERFORM RANGE OF MOTION EXERCISES IN WATER, OR HYDROTHERAPY, TO HELP REDUCE PAIN AND INCREASE MUSCLE RELAXATION.**

- **DEPENDING ON YOUR CIRCUMSTANCES, YOUR DOCTOR MAY JUST WANT YOU TO SIT IN WHIRLPOOL OR BATH UNTIL YOU ARE STRONG ENOUGH TO DO EXERCISES**

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THE ANTERIOR CRUCIATE LIGAMENT (ACL) IS A CRUCIATE LIGAMENT WHICH IS ONE OF THE FOUR MAJOR LIGAMENTS OF THE HUMAN KNEE.

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Anterior Cruciate Ligament

(ACL)

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ANTERIOR CRUCIATE LIGAMENT INJURY IS THE MOST COMMON KNEE LIGAMENT INJURY, ESPECIALLY IN ACTIVE CLIENTS.

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LATERAL ROTATIONAL MOVEMENTS IN SPORTS ARE WHAT CAUSE THE ACL TO STRAIN OR TEAR.

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STRAINS CAN SOMETIMES BE FIXED THROUGH PHYSICAL THERAPY AND MUSCLE STRENGTHENING, THOUGH TEARS ALMOST ALWAYS REQUIRE SURGERY.

THE MOST COMMON METHOD FOR REPAIRING ACL INJURIES IS ARTHROSCOPIC SURGERY

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DOCTORS WILL EITHER USE A PATIENT'S OWN TENDONS, SUCH AS PART OF THEIR HAMSTRING, OR LIGAMENTS FROM CADAVERS TO CONSTRUCT A NEW ACL.

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THE MAJOR GOALS OF REHABILITATION FOLLOWING ACL SURGERY ARE: RESTORATION OF JOINT ANATOMY; PROVISION OF STATIC AND DYNAMIC STABILITY; MAINTENANCE OF THE AEROBIC CONDITIONING AND PSYCHOLOGICAL WELL BEING; AND EARLY RETURN TO WORK AND SPORT. THESE HAVE REQUIRED THE DEVELOPMENT OF AN INTENSIVE REHABILITATION PROGRAM IN WHICH THE PATIENT HAS TO TAKE AN ACTIVE INVOLVEMENT.

MK
PILATES

THE GRAFT UNDERGOES PHYSIOLOGICAL CHANGES DURING ITS INCORPORATION, AS FIBROBLASTIC ACTIVITY CHANGES THE BIOLOGY OF THE GRAFT TO BECOME MORE LIGAMENTOUS.

THE GRAFT IS WEAKEST BETWEEN six and twelve weeks POST OPERATIVELY SO PROGRAMS MUST BE DESIGNED TO PROTECT THE GRAFT DURING THIS PERIOD.

MK PILATES

ON THE OTHER HAND INVESTIGATIONS INTO LIGAMENTOUS HEALING HAVE SHOWN THAT PROGRESSIVE CONTROLLED LOADING PROVIDES A STIMULUS FOR HEALING WHICH IMPROVES THE QUALITY OF GRAFT INCORPORATION.

MORE OVER, EARLY IMMOBILIZATION HAS ADVANTAGES SUCH AS MAINTENANCE OF ARTICULAR CARTILAGE NUTRITION AND RETENTION OF BONE MINERALIZATION.

MK
PILATES

RESEARCH HAS SHOWN QUADRICEPS CONTRACTION CAUSES GREATEST STRAIN ON THE ANTERIOR CRUCIATE LIGAMENT GRAFT BETWEEN 10° AND 45° OF FLEXION.

THE ANTERIOR CRUCIATE LIGAMENT GRAFT LACKS THE NORMAL MECHANORECEPTORS THAT PROVIDE BIOFEEDBACK IN THE UNINJURED KNEE.

ALL THESE FACTORS MUST BE TAKEN INTO ACCOUNT WHEN DESIGNING REHABILITATION PROGRAMS.

MK
PILATES

FOUR PHASE REHABILITATION PROGRAMME
THE REHABILITATION PROGRAM IS DIVIDED INTO
FOUR PHASES.

MK
PILATES

In the first one TO TWO WEEKS THE AIMS OF THERAPY ARE TO DECREASE PAIN AND SWELLING, AND INCREASE THE RANGE OF MOTION OF THE KNEE.

A POST-OPERATIVE BRACE IS RANGED FROM 30 TO 90° AND IS USED UNTIL THERE IS ADEQUATE QUADRICEPS CONTROL.

MK
PILATES

PHYSIOTHERAPY INCLUDING CPM IS USED IMMEDIATELY POST OPERATIVELY. IN THIS EARLY PHASE THERE IS AN EMPHASIS ON STATIC CONTRACTION OF THE HAMSTRINGS AND CO-CONTRACTIONS OF THE HAMSTRINGS AND THE QUADRICEPS.

CRUTCH -WALKING WITH PARTIAL WEIGHT BEARING IS ALLOWED AND THE USUAL MODALITIES ARE USED TO REDUCE PAIN AND SWELLING.

MK
PILATES

**CONTINUOUS PASSIVE MOTION TREATMENT (CPM)
WHAT IS CONTINUOUS PASSIVE MOTION (CPM) TREATMENT?CONTINUOUS PASSIVE MOTION IS USED BY THE PHYSICAL THERAPISTS AT SUMMIT ORTHOPEDICS AS A POSTOPERATIVE TREATMENT METHOD DESIGNED TO AID IN RECOVERY AFTER JOINT SURGERY. CPM TREATMENT IS USED TO GENTLY BEND (FLEX) AND STRAIGHTEN (EXTEND) YOUR JOINT.**

PASSIVE RANGE OF MOTION IS THE PROCESS OF MOVING THE JOINT WITHOUT THE PATIENT'S MUSCLES BEING USED. THIS IS ACCOMPLISHED WITHOUT PATIENT EFFORT AS THE MACHINE MOVES THE JOINT THROUGH A PRESCRIBED RANGE OF MOTION FOR AN EXTENDED PERIOD OF TIME.

MK
PILATES

During the second phase, FROM TWO TO SIX WEEKS, THE EMPHASIS IS ON INCREASING THE RANGE OF MOTION, INCREASING WEIGHT BEARING AND GAINING HAMSTRING AND QUADRICEPS CONTROL. THE PATIENT IS USUALLY OUT OF THE BRACE BY THE THIRD TO FOURTH WEEK.

DURING THIS PHASE GAIT RE-EDUCATION AND STATIC PROPRIOCEPTION EXERCISES COMMENCE. THIS MAY INCLUDE BALANCING ON THE AFFECTED LEG, BIOFEEDBACK TECHNIQUES AND POOL WORK TO MAINTAIN CONDITIONING AND RANGE OF MOTION.

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PILATES

During the third stage, FROM SIX TO TWELVE WEEKS, EMPHASIS IS PLACED ON IMPROVED MUSCULAR CONTROL, PROPRIOCEPTION AND GENERAL MUSCULAR STRENGTHENING.

PROPRIOCEPTIVE WORK PROGRESSES FROM STATIC TO DYNAMIC TECHNIQUES INCLUDING BALANCE EXERCISES ON THE WOBBLE BOARD AND EVENTUALLY JOGGING ON A MINI-TRAMP.

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PROGRAMME

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PILATES

2-6 Weeks no leg series on reformer

use ball for range of movement exercises - non weight bearing

MK PILATES

AFTER BRACE REMOVED 3-4 WEEKS
ADD LEG SERIES - START ON HEELS MORE REPS LIGHT SPRINGS FOCUS ON CORE
WHEN ADDING TOES PARALLEL, FOCUS
ADD DEMI PLIES AFTER 6 WEEKS
INCREASING SPRING TENSION

CORE WORK AND BALANCE WORK

MK
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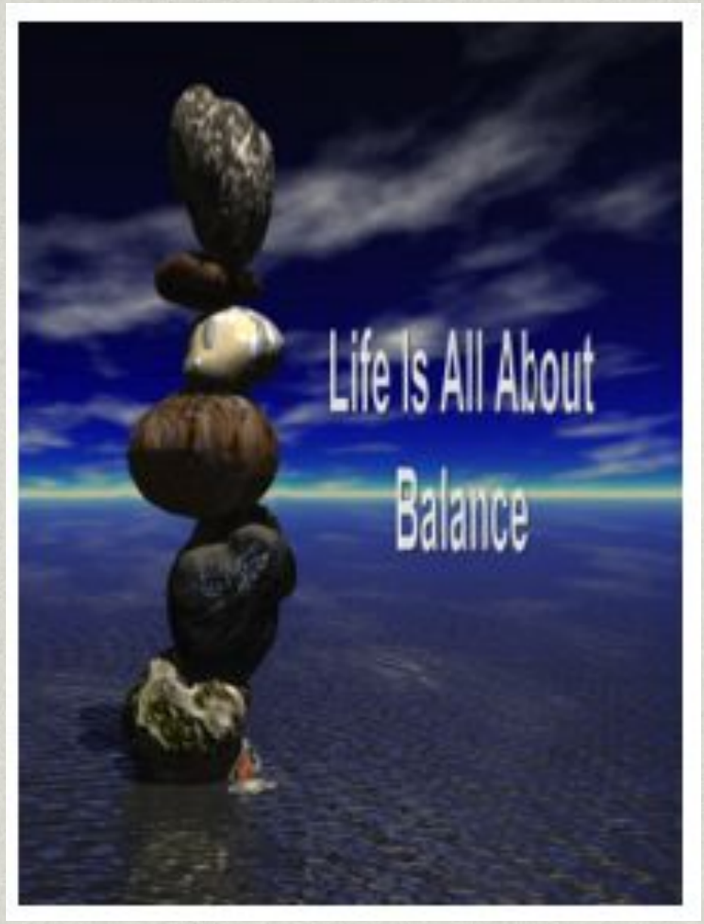

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