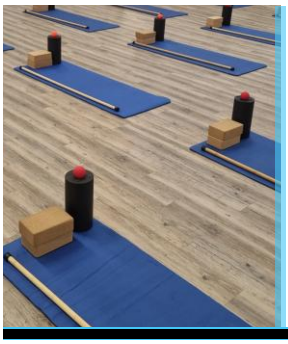


MOVE STRETCH BREATHE

FOR SELF-CARE AND CLINICAL PRACTICE

PRESENTED BY MARTY FRY

1

MY JOURNEY

Diploma of Remedial Massage

Cert 3 and 4 in Fitness

FIFA Diploma in Football Medicine

Stretch Therapy Teacher

Stretching and Flexibility Coach

Mobility Coach

Stick Mobility Trainer

Corrective Exercise - TBMM

Advanced Breathwork Instructor

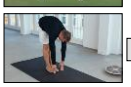
2

OVERVIEW

We will begin with an overview of the theories behind mobility, flexibility and the breath.

We will explore our own movement and breath, discuss techniques on how to improve disfunction and how these methods can be of practical use to our client outcomes and importantly for our own self-care.

MOBILITY



FLEXIBILITY

BREATH

PUTTING IT ALL TOGETHER

3

LOOKING THROUGH DIFFERENT LENSES

OPINION — What we think works. Our personal view of the best approach.

EXPERIENCE — What we have felt . It's ok to do something because it feels good.

RESEARCH — What is the research telling us? The science of the how and why.

4

WHY?

"Stiffness and restricted range of motion (ROM) are the most common clinical presentations second to pain"

Eyal Lederman, Theraputic Stretching Towards a Functional Approach.

PAIN

- It hurts.
- It's painful to touch.
- It's painful when i move.

STIFFNESS

- I feel like i can't move.
- It takes me a bit to get going.
- I feel like i am old.

RESTRICTED ROM

- I can't move past this point
- I can't lift my arm above my head.
- I struggle to reach to pick something up.

5

THE STATISTICS

46.9%

Nearly half (46.9%) of employed Australian adults aged 18–64 years described their day at work as mostly sitting.

81%

Eighty-one per cent of Australian workers report some sitting at work (occupational sitting).

78%

In 2022, based on self-reported data from the ABS 2022 NHS, it is estimated that 78% of adults aged 18–64 were insufficiently physically active.

Our bodies tend to mold themselves into the positions in which we spend the most time.

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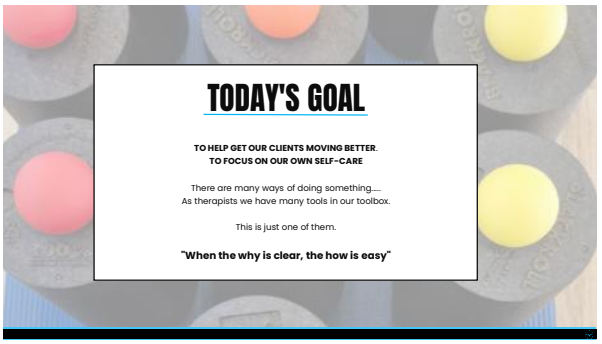


TODAY'S GOAL

TO HELP GET OUR CLIENTS MOVING BETTER.
TO FOCUS ON OUR OWN SELF-CARE

There are many ways of doing something....
As therapists we have many tools in our toolbox.

This is just one of them.

"When the why is clear, the how is easy"

7

WHY ENCOURAGE SELF CARE?

- Self-care is a fundamental and integral part of treatment and patients who engage in self-care have significantly improved clinical outcomes, with better quality of life and longer survival (Riegel et al., 2021).

- When people self care and are supported to do this, they are more likely to experience better health and well-being; reduce the perceived severity of their symptoms, including pain(United Kingdom Department of Health, 2006).

There is 8760 hours in a year, and we may see a client for 10-15 of those hours.
How can we help them the rest of the time?

8

MOBILITY

Mobility should be used to describe joint motion.

The ability to move. (MOVEMENT ABILITY)

It's a combination of flexibility, strength, and motor control.

Mobility is the ability to move freely and easily.

It's the active range of motion through your joints and muscles.

"Move it, or lose it"

9

MOBILITY

We create and influence our structure by the way we move.

When you incorporate mobility exercises:
- You can maintain your body's range of motion
- Maintain your body's functional movement patterns
- Maintain the ability to move smoothly.
- Mobility training is based on motor control rather than just passive stretching which is why it's easier to maintain long term. It becomes something that's programmed in us.

The more mobile a person is, the more they are able to maximize their movement potential safely, efficiently and effectively.

We must have balance between joint mobility and stability.

10

FLEXIBILITY

Flexibility is commonly defined as the normal extensibility (ability to stretch) of all soft tissues (contractile and non-contractile) that allow the complete range of motion (ROM) of a joint.

Flexibility is having the optimal amount of extensibility in the fascia and muscular systems to adequately perform a physical task.

Flexibility is the ability of a muscle or muscle groups to lengthen through a range of motion.

11

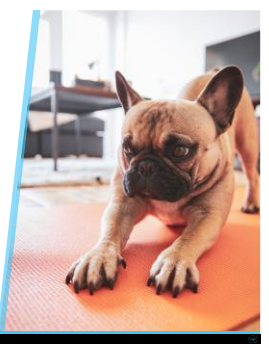
FLEXIBILITY

STRETCHING IS A FORM OF FLEXIBILITY TRAINING.

Stretching is a natural and instinctive activity performed by humans and animals. You usually automatically stretch after waking from sleep, after sitting in the car or being in an uncomfortable position.

Pandiculation, the act of stretching oneself and yawning, especially upon waking.

Pandiculation:
- Is our nervous system's natural way of waking up our sensorimotor system and preparing us for movement.
- Sends biofeedback to our nervous system regarding the level of contraction in our muscles, thereby helping to prevent the build up of chronic muscular tension.



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THE DIFFERENCE

If someone has good flexibility in their hamstring muscles, they can easily touch their toes while keeping their legs straight.

However, mobility comes into play when they perform a movement like getting up off the floor, where they need not only flexible hamstrings but also strength and control to stabilise themselves.

STRETCHING IS A FORM OF FLEXIBILITY TRAINING.

DYNAMIC MOVEMENT IS A FORM OF MOBILITY TRAINING.

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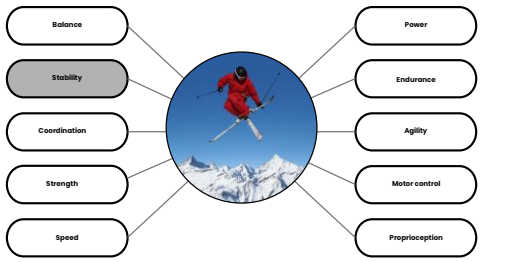
MOVEMENT

Mobility, flexibility and the breath are just 3 pieces in the puzzle towards better movement.



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STABILITY

Stability is defined as: Your body's ability to safely and effectively maintain and control various postures as well as resist changes in equilibrium.

- Basically, stabilizing muscles are the most important muscles for supporting and holding your body upright.
- You utilize stability to perform everyday tasks.

Gray Cook, the founder of Function Movement Systems suggests that: "The body works in an alternating pattern of stable segments connected by mobile joints."

This means your body utilizes both passive stabilizers (ligaments, joint capsule, discs) and active stabilizers (muscles, nerves, receptors) interdependently to create stability.

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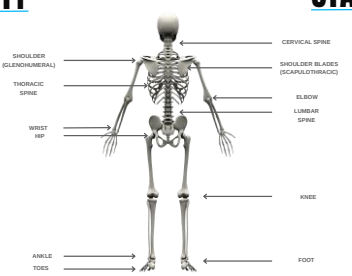
MOBILITY

STABILITY



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MOBILITY - STABILITY

Example: Rolling the ankle.

- Due to the injury this mobile joint quickly becomes immobile.
- This can place stress on the knee and making what is usually a stable joint possibly unstable.
- Depending on the severity of the injury, rolling an ankle can require reduced loading for a period of time.
- This means that the knee and hip become more sedentary in that time, causing a loss of mobility/stability in each joint.
- The gait with which the person had before they rolled their ankle simply does not return to normal if all joints are not taken care of.

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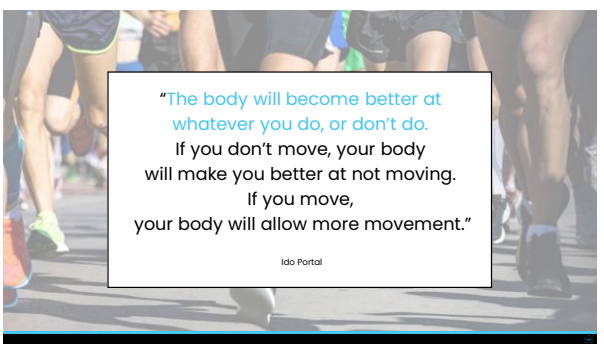

"The body will become better at whatever you do, or don't do.
If you don't move, your body will make you better at not moving.
If you move,
your body will allow more movement."

Ido Portal

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COMPONENTS OF MOBILITY & FLEXIBILITY

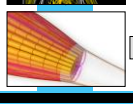
What do we influence with mobility and flexibility ?

- Joints
- Muscle
- Nerve
- Connective tissue


JOINTS


MUSCLE


NERVE


CONNECTIVE TISSUE

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JOINTS

Joints allow our bodies to move in many ways.

Joints are classified by their range of movement:

Fibrous joints – little or no movement. (the skull)

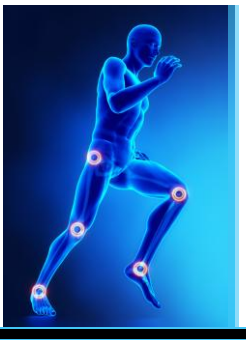
Cartilaginous joints - move a little. (The vertebrae)

Synovial joints - move in many directions. Built for movement

Ball and Socket joints - the most moveable

Hinge joints – allow motion in one direction

Pivot joints - rotate around an axis



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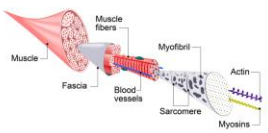
MUSCLE



All muscles share the same basic structure.

- Muscle is composed of many strands of tissue called fascicles. Each fascicle is composed of bundles of muscle fibers.
- The muscle fibers are in turn composed of tens of thousands of thread-like myofibrils, which can contract, relax, and elongate.
- The myofibrils are composed of millions of bands laid end-to-end called sarcomeres.
- Each sarcomere is made of overlapping thick and thin filaments called myofilaments.
- The thick and thin myofilaments are made up of contractile proteins, primarily actin and myosin.

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MUSCLE

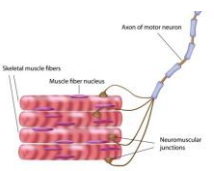
The way in which muscle operate is as follows:

•Nerves connect the spinal column to the muscle.

•When an electrical signal crosses the neuromuscular junction, it is transmitted deep inside the muscle fibers.

•Inside the muscle fibers, the signal stimulates the flow of calcium which causes the thick and thin myofilaments to slide across one another. When this occurs, it causes the sarcomere to shorten, which generates force.

•When billions of sarcomeres in the muscle shorten all at once it results in a contraction of the entire muscle fiber.



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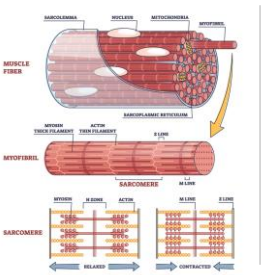
SARCOMERE'S



Muscle fiber contract / relax unit

• Base unit of contraction in a muscle fiber

- Increasing range of movement begins within the muscles at the sarcomeres.
- When a particular body part is placed into a position that lengthens the muscle, the overlap between the thick and thin myofilaments begins to decrease. The sarcomeres are fully stretched, the muscle fiber is at its maximum resting length.
- Further stretching will help to elongate the connective tissues and muscle fascia.

"With regular stretching over time, the number of sarcomeres is thought to increase in series, with new sarcomeres added onto the end of existing myofibrils, which in turn increases the overall muscle length and range of motion."

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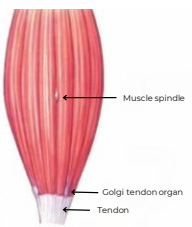
WHAT HAPPENS WHEN WE STRETCH



To understand how the principle of stretching works, it is important to define two proprioceptive parts of a muscle, the golgi tendon organ and the muscle spindle and the importance of the stretch reflex.

A stretch happens when a particular muscle is at the end of it's ROM or elasticity point. At this point, the muscle contracts to protect you from injury. It's called a stretch reflex. This contraction is the sometimes-unpleasant "stretch" feeling that tells you it's time to stop.

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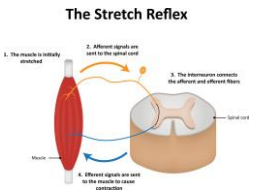
WHAT HAPPENS WHEN WE STRETCH

Muscle Spindles – The Stretch Reflex
Muscle spindles sense change in muscle length and send a signal to the spine. This signal triggers the stretch reflex (also called myotatic reflex). The stretch reflex resists the increase in muscle length by causing a muscle to contract. The more rapidly muscle length increases, the stronger the stretch reflex is. Therefore, the primary function of muscle spindles is to protect the body from injury due to over-stretching.

Golgi Tendon Organ (GTO) – Autogenic Inhibition
The GTO is a nerve receptor located at the junction of a muscle and tendon. During a stretch, the GTO senses tension in the muscle/tendon and sends a signal via afferent neurons to the spinal cord. The spinal cord then sends a signal back to the muscle to relax via efferent neurons. This is called the Golgi tendon reflex. The GTO exists to regulate muscle tension so that injury does not occur to a muscle and its associated connective tissue.



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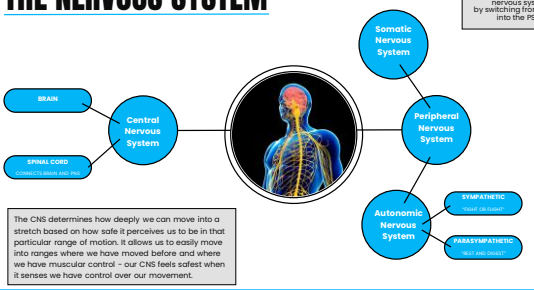
THE NERVOUS SYSTEM

Stretching provides an opportunity to calm the nervous system, by switching from the SNS into the PSNS.



The CNS determines how deeply we can move into a stretch based on how safe it perceives us to be in that particular range of motion. It allows us to easily move into ranges where we have moved before and where we have muscular control - our CNS feels safest when it senses we have control over our movement.

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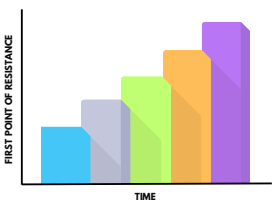
STRETCH TOLERANCE

Stretch tolerance is the limit to which you can TOLERATE the discomfort associated with stretching.

It's a sensory theory, in which an individual adapts to and becomes less sensitized to discomfort associated with stretching or finding the sensation to become more tolerable after repeated exposure to the sensation of stretching.

The main premise of this sensory theory is that changes in ROM are not due to alterations in tissue properties but in sensory tolerance.



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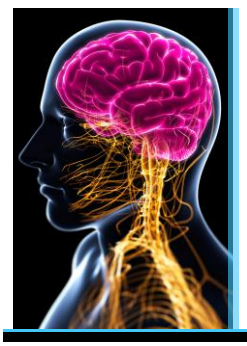

THE BRAIN AND MOVEMENT

The process of moving begins in the brain.
- Premotor cortex creates a plan
- Motor cortex executes the communication with muscles via nerve signals.
- Cerebellum and basal ganglia coordinate movements and ensure they are performed smoothly and accurately.

Motor Learning
With practice the nervous system becomes efficient in controlling movement and activating the necessary muscles for the required movement.

New or challenging movements promote neuroplasticity as they challenge the brain to adapt and recognize the new demands placed on it.

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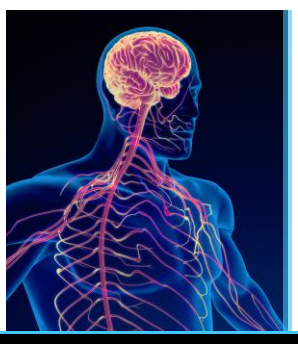

"Flexibility isn't about using physical force to lengthen muscles, it's about communication; reassuring our nervous system that a particular range of motion is safe to move into."

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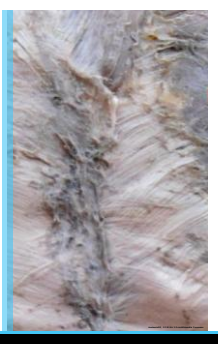

FASCIA

- It has a dual purpose of both stability and movement.
- It allows our tissues to slide dynamically and yet holds us firmly together and governs the shape of the body.
- It is incredibly strong when required, it can also be molded easily.
- Our fascial system is the mediator between all systems of the body and provides a large amount of sensory information back to the brain as to how we are moving.

"Stretching cannot avoid affecting various types of fascial tissues. Connective tissues respond differently to the various forms of stretch, depending on their density and composition"

Connection to the Autonomic Nervous System. - Schleip

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THE SENSORY EFFECT

Proprioceptors, nociceptors and mechanoreceptors are also present in fascia.

Proprioception results from sensory receptors in your nervous system and body. Most of these receptors are located in your muscles, joints, and tendons. When you move, the receptors send detailed messages to your brain about your positions and actions. Your brain processes these messages and works with your vision, nervous system, and vestibular system to create your perception of where your body is and how you're moving.

Nocioception is the sensory nervous system's process of encoding noxious stimuli. It deals with a series of events and processes required for an organism to receive a painful stimulus, convert it to a molecular signal, and recognize and characterize the signal to trigger an appropriate defensive response.

Fascia is also densely innervated with a type of sensory nerve ending called **mechanoreceptors**, which detect touch, pressure, stretch, and vibration.
All these sensory receptors contribute to our sense of the inner state of our body: our interoception.

There is research suggesting that stretch tolerance may be influenced by nociceptive nerve endings, mechanoreceptors, and/or proprioceptors.

Lee DT, Harvey LA, Nicholas MK, Tonkin L, de Jesus NJ, Finniss DG. Stretch exercises increase tolerance to stretch in patients with chronic musculoskeletal pain: a randomised controlled trial. Phys Ther. 2009;89(10):1041-54.

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VISCOELASTICITY

"S.Peter Magnusson, a well-respected stretch researcher from Denmark, indicated that the acute effects of stretching in the holding phase of a stretch are due to changes in tissue viscoelasticity.

The underlying mechanism for this viscoelastic effect is thixotropy, which occurs when viscous(thicker) fluids become less viscous or more fluid like when agitated, sheared or stressed. When the stress is removed or desists, then the fluid takes a certain period to return to its original viscous state."

The science and Physiology of Flexibility and Stretching, Implications and Applications in Sport performance and Health - David G. Behm

- Increased thixotropy may provide less resistance to the movement or sliding of muscle fibres, tendons and fascia.
- Temperature can have an impact on thixotropy.

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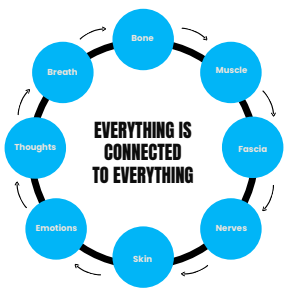
THE GLOBAL EFFECT

IT ALL AFFECTS THE WAY WE MOVE



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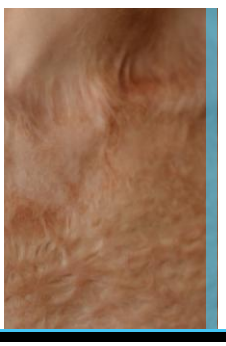

FACTORS INFLUENCING MOBILITY AND FLEXIBILITY

- The temperature of the muscle, joint and body
- The ability of the muscle to respond to stretch
- Tissue scarring
  eg. Chronic muscle strain/tear forming scar tissue
- Physical and emotional health – The way you feel
- Elasticity of skin
  eg. A burn or scar alters the skin's ability to stretch
- Bone structures
  Bone/Joint degeneration may effect/influence surrounding tissue
- Commitment to a regular routine
- Genes

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INFLUENCING FACTORS

AGE
• Joint movement becomes stiffer and less flexible because the amount of lubricating fluid inside your joints decreases, and the cartilage becomes thinner. • Ligaments also tend to shorten and lose some flexibility, making joints feel stiff. • Many of these age-related changes to joints are caused by lack of exercise.

GENDER
• Females tend to be more flexible than males • The female pelvis is wider. • Hormones- have a sizeable impact on flexibility in females as, during the phase of the menstrual cycle where estrogen and relaxin are highest, collagen decreases by 40%. **Silvers and Mandelbaum, 2007**
• Lower collagen production is linked to higher levels of flexibility.

PROPORTIONS
Limb length - The way your built - Joint health - Tissue health
Genetics: Genes play a large role in an individual's natural flexibility

MOVEMENT HABITS
• Fascia and muscle follows our life patterns; it is shaped by them. • Sitting can actually lead to more connective tissue building up, which can restrict us like scar tissue does. **Bowman, 2014** • Postural positions and muscle imbalances can lead to dysfunctional movement and muscle tightness.

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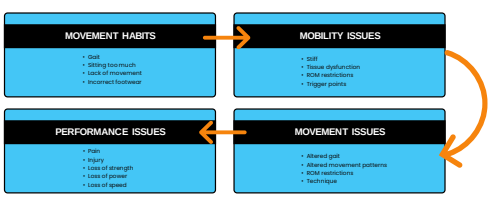
FACTORS INFLUENCING MOBILITY AND FLEXIBILITY



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HYPERMOBILITY AND HYPOMOBILITY

HYPERMOBILITY

- Hypermobility means your joints can move beyond the normal range of motion.
- Individuals with hypermobility may experience joint instability, subluxations, or dislocations, leading to pain, swelling, and stiffness
- Individuals with hypermobility may demonstrate joint laxity, hyperextension, and increased range of motion.

HYPOMOBILITY

- Hypomobility is a condition in which a person experiences a limited range of motion in a joint.
- Hypomobility can cause pain due to restricted movement, muscle imbalances, and joint degeneration
- Hypomobility may present as joint stiffness, reduced flexibility, and muscle tightness.

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LENGTHEN OR STRENGTHEN

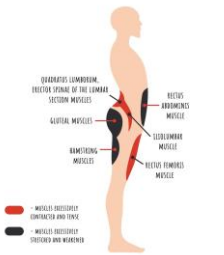
Not all tight muscles need to be stretched.

Hypertonic muscles:
- Short and tight from habitual concentric contraction.
- Stretching may help to restore tone and length

Eccentrically stressed:
- Long and tight (Postural stress)
- Pec / Rhomboid relationship (Computer pose) (stretch the pecs, strengthen the rhomboids)

Crossed syndrome(Janda):
- Muscle imbalances found in the body as described by Vladimir Janda
- Upper and lower crossed syndrome

Muscle weakness from inhibition:
- Pec / Rhomboid relationship - not just a mechanical force but also a neurological inhibition. (stretch the pecs and sometimes the rhomboids regain strength)



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THEORIES ON STRETCHING

There are various theories as to why stretching increases flexibility such as viscoelastic deformation, plastic deformation, increased sarcomeres in series, and neuromuscular relaxation.

A range of studies have found no adaptions to stretching can be attributed to the stretch reflex.

Improved range of motion from stretching comes via many changes including:

Viscoelastic change: The effect on viscous and elastic properties of muscle and tendon.

Sensory change: Nervous system and stretch tolerance.

Mechanical changes: change in muscle fibres.

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WHY STRETCH?

THERAPEUTIC
- Improves function
- Improves ROM
- Reduce pain
- Improves posture
- Promote blood and nutrient supply
- Reduces adhesions between fascial layers

SPORT / EXERCISE
- Improve performance flexibility
- Warm up
- Reduce injuries
- Reduce muscle soreness
- Raise temperature
- Enhance coordination
- Mind body connection
- Recovery

RECREATIONAL
- Pleasure
- Social contact
- Exercise
- Improve health
- Spiritual (Yoga)
- Because it feels good

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BENEFITS

SLEEP
A study by **Hirakawa et al.** published in the "Journal of Physiological Anthropology and Applied Human Science" in 2003 found that participants who performed static stretching exercises before bedtime experienced improved sleep quality and duration. Stretching helps relax tense muscles and prepares the body for a restful night's sleep.

MOOD
A study by **Stanton & Reaburn, 2010** published in the "Journal of Sport and Exercise Psychology" in 2010 found that individuals who engaged in regular static stretching reported reduced feelings of anxiety and depression. This mood enhancement is believed to be linked to the release of endorphins during stretching, which are natural mood elevators.

STRESS
A study by **Woods et al., 2013** published in the "Journal of Behavioral Medicine" in 2013 found that participants who engaged in regular static stretching experienced a significant decrease in perceived stress levels. The gentle, sustained nature of static stretching helps activate the body's parasympathetic nervous system, promoting relaxation and reducing the production of stress hormones like cortisol.

PAIN
Static stretching can be a valuable tool in managing and reducing pain. A study by **Hrysomallis** (2011) published in the "Journal of Orthopaedic & Sports Physical Therapy" found that static stretching exercises significantly reduced pain and improved functional performance in individuals with chronic low back pain.

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JOINT RANGE OF MOTION

FUNCTIONAL
- Prevent or reduce pain
- Reduce your risk of injury
- Maintain or improve strength and balance
- Maintain joint flexibility
- Maintain functional abilities like reaching overhead or climbing stairs
- Enjoy optimum mobility

RESTRICTED

Causes:
- Inflammation of the soft tissues surrounding the joint, or joint swelling
- Muscle Stiffness
- Pain
- Joint Dislocation / Fractures

Non-pathological causes:
- Tight Clothing
- Hypertrophy of muscles due to strength training
- Adipose tissue

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RANGE OF MOTION ADAPTION

VASCULAR

Vascular and lymphatic system reorganization is also observed under tensional forces. In laboratory studies, externally applied stretching was shown to regulate the sprouting of new blood vessels, their length and their alignment in the tissue.(*)

MOTOR CONTROL

The loss and recovery of the active ROM is closely related to the adaptive capacity of the motor system. These adaptive changes can be observed throughout the central nervous system. Motor control changes are expected to normalize rapidly if there are no central nervous system pathologies.

NOCICEPTIVE & SENSITIZATION

ROM sensitivity and desensitization are also associated with adaption within nociceptive system and psychological dimension

PSYCHOLOGICAL / COGNITIVE

Adaption in the form of learned and changes in movement behaviour.

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JOINT RANGE OF MOTION

FULL ROM - NO DISCOMFORT
Effective programming

FULL ROM - WITH DISCOMFORT
Investigate restrictions

LIMITED ROM - NO DISCOMFORT
Restore ROM - Investigate restrictions

LIMITED ROM - WITH DISCOMFORT
Investigate restrictions / Further testing /Refer

JOINT	MOVEMENT	AVERAGE RANGE OF MOTION(DEGREES)
SHOULDER	FLEXION EXTENSION ABDUCTION INTERNAL ROTATION EXTERNAL ROTATION	0-180 0-60 0-180 0-70 0-90
ELBOW	FLEXION	0-150
FOREARM	PRONATION SUPINATION	0-80 0-80
WRIST	FLEXION EXTENSION	0-80 0-70
HIP	FLEXION EXTENSION ABDUCTION ADDUCTION INTERNAL ROTATION EXTERNAL ROTATION	0-120 0-30 0-45 0-30 0-45 0-45
KNEE	FLEXION	0-155
ANKLE	DORSIFLEXION PLANTARFLEXION	0-20 0-50

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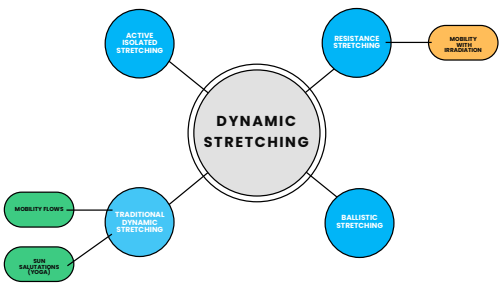
TYPES OF STRETCHING



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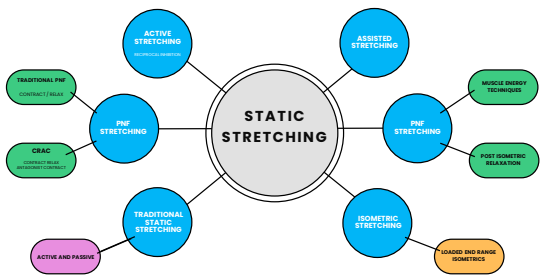
TYPES OF STRETCHING



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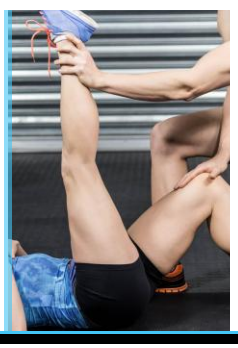
PROPRIOCEPTIVE NEUROMUSCULAR FACILITATION (PNF)

During PNF stretching, a muscle is repeatedly contracted and relaxed, which promotes the response of the nerve impulses to recruit muscles through stimulation of the proprioceptors (e.g. Muscle spindle and Golgi Tendon Organs).

There are many different variations of the PNF stretching principle:

- Facilitated stretching
- Contract-Relax (CR) stretching or Hold-Relax stretching
- Post Isometric Relaxation (PIR)
- Muscle Energy Technique (MET) are variations of the PNF technique.
- Contract-Relax-Antagonist-Contract (CRAC) is also a variation.

ISOMETRIC STRETCHING



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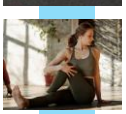
PNF - CONTRACT / RELAX

Two fundamental principles of PNF:

- **Post-Isometric Relaxation(PIR)**: Following a contraction (5-10 seconds), a muscle enters a deeper state of relaxation (for around 5 seconds). These contractions are usually isometric but can also be performed with a concentric contraction (muscle shortening).

- **Reciprocal Inhibition (RI)**: When a muscle contracts, the opposing muscle must relax to allow for efficient movement. Therefore, when contracting an opposing muscle or directly after, you are able to achieve a greater stretch. The nature of this technique allows you to engage the opposing muscles to "actively" reach the barrier position of the targeted muscle.

Some research suggests that reciprocal inhibition may not be responsible for the increased range of motion (ROM) gained through proprioceptive neuromuscular facilitation (PNF) stretching.



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ISOMETRICS

An isometric contraction is a muscle contraction without a change of length.

- Research has shown increased ROM with the use of isometric contractions, but the results are not consistent.
- Can be applied to opposing muscle -
  Some research suggests this has no additional benefit to increasing ROM (Reciprocal inhibition)
- Improved Strength and Stability
- Rehabilitation and Recovery
- Blood Flow and Pressure Management
- Enhanced Mind-Muscle Connection
- Great progression from static stretching.
- Can progress to a longer contraction time.
- Great to strengthen ROM - **The principal of IRRADIATION**

What is the benefit of having maximum range of motion if you are not strong enough through that range of motion to use it fully without the risk of injury

Rowlands, A.V., Marginson, V.F., & Lee, J. (2003). Chronic flexibility gains: Effects of isometric contraction duration during proprioceptive neuromuscular facilitation stretching techniques. Research Quarterly for Exercise and Sport, 74(1), 47-51.

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TENSION AND INTENSITY

Tension: refers to the feeling of tightness or pull you experience in a muscle when it's being stretched.

Intensity: describes the degree of that tension, essentially how hard you are pulling on the muscle during the stretch.

While some tension is expected during a stretch, you should never feel sharp or severe pain; if you do, ease back on the stretch.

The aim is for a comfortable level of tension where you feel a gentle pull in the muscle, without pushing to the point of discomfort.

Consistency beats intensity
Small, daily stretching is often more effective than occasional, intense longer sessions.

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STRETCH DURATION

While there are contradictory studies regarding exactly how long a stretch should be held to be most effective, it appears that somewhere around 30 seconds is ideal. By holding a stretch for 30 seconds, the stretch reflex will be minimized, thus allowing for greater range of motion. Very short and/or sudden stretches will likely trigger the stretch reflex and therefore will inhibit the ability of a muscle to stretch.

The reality is that the ideal time duration is likely individually-based.

Slowly stretching and holding for around 30 seconds is recommended.

BANDY et al. determined that 30 seconds is the minimum threshold for flexibility benefits for static stretching.

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THE BREATH

"If breathing is not normalized, no other movement pattern can be."
(Chapman et al., 2016)

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LIGHT - SLOW - LOW

Benefits of nasal breathing:
Increase 02 uptake and delivery, recruitment of diaphragm.

Benefits of light breathing:
Increase blood flow and O2 delivery.

Benefits of slow breathing:
Engages the diaphragm.
Connection to the vagus nerve.
Calms the nervous system because slower exhalations activate the PNS.

Benefits of breathing from diaphragm:
Improve recruitment of diaphragm for stabilization of the spine.

Always move to the next point of resistance within a stretch on the exhale.

The breath has a direct effect on the nervous system, which in turns controls flexibility.

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WHY THE DIAPHRAGM ?

Healthy breathing and proper movement of the diaphragm occurs with minimal movement of the upper chest.

When the diaphragm is not able to move freely back to its domed resting position, the result is a rigid, immobile ribcage that drives breathing into the upper chest.

When you breathe in, your diaphragm moves downwards, producing positive pressure in the abdominal cavity. This pressure works a bit like an inflating balloon. It has a stabilizing effect, supporting the spine and pelvis. When breathing is fully functional, the diaphragm is better able to generate optimal IAP – and better spinal stability.

Stephens, Rylee J., Mitchell Haas, William L. Moore III, Jordan R. Emmil, Jayson A. Sipress, and Alex Williams. "Effects of diaphragmatic breathing patterns on balance: a preliminary clinical trial." Journal of manipulative and physiological therapeutics 40, no. 3 (2017): 169-175.

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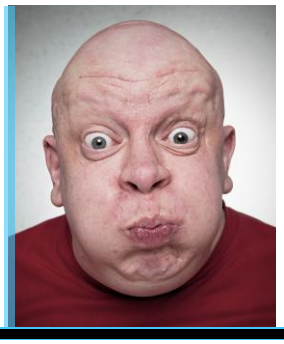
"If you can't breathe in a position, you don't own that position"

Gray Cook



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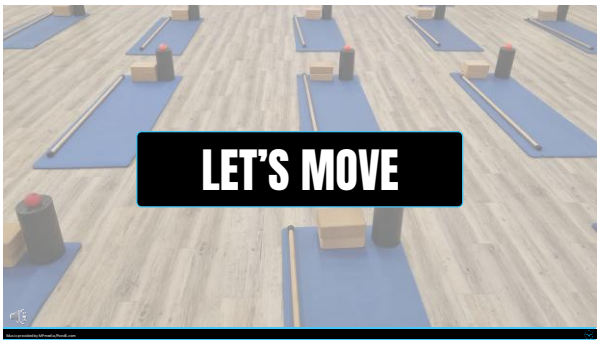

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CONTRAINDICATIONS

- If you feel pain
- Muscle or joint inflammation
- 24-72 Hours after trauma – allow time for healing
- Recent fractures
- Open wounds and Vascular conditions
- Hypermobile people –
  May require stabilization exercises before stretching
- Caution when performing partner assisted stretching
  Always be guided by the recipient
- Caution to pregnant clients – Loosening connective tissue

57

PROGRESSIONS AND REGRESSIONS

Progressions and regressions can involve changing the load, range of motion, stability, complexity, or frequency of an exercise.

Progression
Increases the difficulty of an exercise by making it more stimulative.

Regression
Makes an exercise easier and less complex by decreasing the demand.

Using progressions and regressions:

Start with regressions: Regressions are a good place to start, especially when beginning a new exercise. Modifying movements can help your body be ready for more advanced exercises and reduce the risk of injury.

Listen to your body: Treat your body with care and regress when needed. It will feel different every day.

Be conscious of your body and nervous system: When performing new movements or movements you have not done in a while, your body and nervous system might not be conditioned to that new movement.

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3 SIMPLE RULES

1. **MOVE SLOWLY**
   Slow movement is safer because it's controllable.
   Allows for more awareness of our bodies.
   It's your practice.
2. **BREATHE**
   Don't hold your breath.
   Breathing allows you to explore more range of motion.
   Move further into the stretch when exhaling.
3. **RELAX**
   Allow the nervous system to feel comfortable in exploring new movements.
   Let the body tell the brain it's safe in this position.

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MY EXPERIENCE

- Be mindful your body feels different every day.
- You are your gauge.
- Move slowly.
- Give your body time to adjust.
- Be aware of what you feel, where you feel and how you feel.
- Micro movements are good movements.
- The more of the body you can involve in the movement, the more of a fascial aspect is created.
- Work with your breath.
- Props are good - not to be thought of as the easy option.
- Get to know your body better, where do you feel restrictions?
- Movement is exploration....Go and explore.

SUPPORT YOURSELF, DON'T FORCE YOURSELF

60

MOVEMENT

Movement is different things, for different people , at different times.





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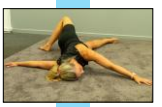
MOBILITY

- Floor sitting
- Spinal mobility
- Shoulder mobility
- Mobility with props

Habit stacking:
Movement with an existing long-term habit
e.g., floor sitting whilst watching TV

YOUR BRAIN LOVES NOVELTY - YOUR BODY LOVES MOVEMENT





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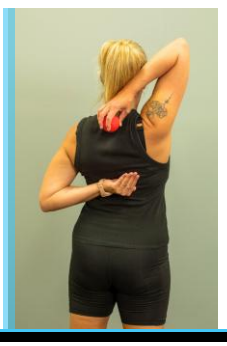
LIFT AND REACH

This test is great for breaking our habitual postures.

- Explore your movement capabilities and limitations
- Improve your body awareness
- Can add strength through your ROM with irradiation



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MOBILITY FLOWS

Mobility flows are a useful way to use your ROM and improve movement patterns.

- Ideal for improving movement transitions
- Improves motor control
- Can be sport or task specific

Move from position to position slowly with full awareness.



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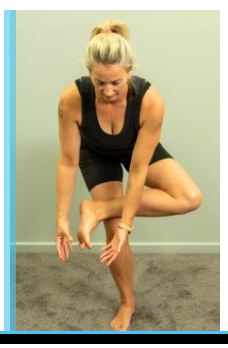
THE SHOE AND SOCK TEST

This test is great for breaking our habitual postures.

It's measurable.

You've got to be mobile enough to bend over and pick items up off the floor. You need balance to do the test while standing on just one leg. You also need the stamina to be able to keep your foot raised while you're putting things on.

- Explore your movement capabilities and limitations
- Improve your body awareness



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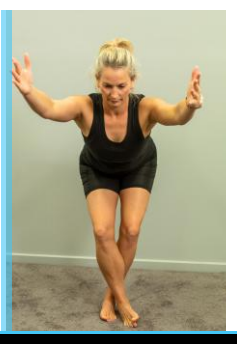
SIT AND RISE

Is the ability to get up and down off the floor a valuable skill as we age?

This test is great for breaking our habitual postures.

It requires mobility, flexibility, stability and motor control.

- Explore your movement capabilities and limitations
- Improve your body awareness



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SQUAT SIT

The squat sit is an effective way to counteract the negative effects of sitting.

The whole body is involved in this position.
- The feet create a base and your arches are activated.
- The calves are being stretched.
- The quads and hamstrings are co-contracting to keep your form.
- The hips are creating tension.
- The spinal erectors and core are keeping the upper body erect.
- The mid-thoracic pulls the shoulders into position.
- The muscles of the neck keep the head neutral.

The sensations will be individually based on how your body positions itself but, the muscles from your feet to your head will be working.

- Explore your movement capabilities and limitations
- Improve your body awareness

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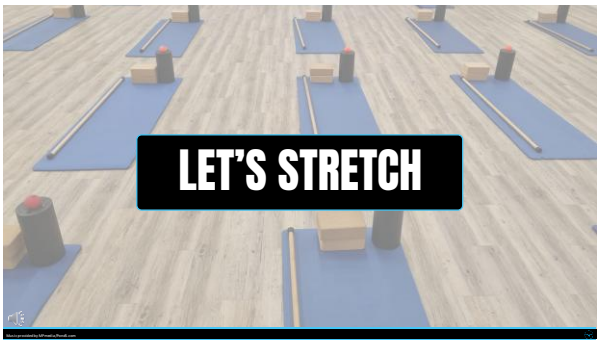

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CONTRACT - RELAX

IT'S SIMPLE:
- Stretch a muscle group.
- Contract this muscle group against resistance while it's still in the stretched position.
- Stretch the muscle group again.

Muscles have been influenced by either:
- Shortening with tension
- Shortening without tension
- Lengthening with tension
- Lengthening without tension
- Held without motion

1. Lengthen the tissue with awareness of breathing.
2. Take the lengthen tissue to the first restriction barrier.
3. Hold or Contract for 5 - 10 seconds.
4. Relax with awareness of breathing.
5. Take the lengthen tissue to the next restriction barrier.
6. Repeat 3-5 times.

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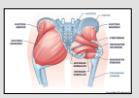
PIRIFORMIS

PIRIFORMIS
Origin: Anterior sacrum
Insertion: Superior aspect of greater trochanter
Action:
Lateral rotation of femur at hip
Helps stabilize hip joint

Potential Muscles Influenced:
- Rectus: maximus/medius/minimus
- piriformis
- gemellus superior/inferior
- obturator externus/internus
- quadratus femoris
- lower biflexmus dorsi
- erector spinae



Steps:
1. Stand upright on one leg
2. Face toilet that is even with or just a little below the hips
3. Bend opposite leg at the hip at about a 90-degree angle and rest on table
4. Rest leg as flat as possible on the surface - can place some cushioning under leg

Steps:
1. Have client get on the floor in the fig 4 stretch position
2. Place client's right foot on your shoulder and place your right hand on their left knee
3. Lean forward to help increase stretch
4. To increase stretch you can place your right knee on the clients left ischial tuberosity

Cautions be your own body mechanics

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HAMSTRINGS

Biceps femoris
Origin: Ischial tuberosity (int linea aspera of femur)
Insertion: Head of fibula
Action: (at hip: extension BOTH; knee flexion, lateral rotation of lower leg with knee flexed
Semimembranosus /semitendinosus
Origin: Ischial tuberosity
Insertion: **Semimembranosus:** posteromedial tibial condyle
Semitendinosus: anterior proximal tibial shaft (pes anserine)
Action: Hip extension, knee flexion, medial rotation of lower leg with knee flexed

Potential Muscles Influenced:
- Bicep femoris
- semitendinosus / semimembranosus
- gastrocnemius / soleus
- Tibialis anterior
- Erector spinae

Steps:
1. Sit on floor with leg stretched out in front of you.
2. Bring the other leg in and rest the sole of your foot on your inner thigh.
3. Lean forward, bringing chest towards the knee.
4. Maintain a straight spine.

The stretch can also be performed using a band.

Steps:
1. Lying on the ground, the client raises leg to a position and angle that allows the feeling of a mild stretch.
2. Opposite leg remains relaxed on the floor
3. You can assist client to flex foot to increase stretch and/or add isometric resistance
4. Move to the next resistance barrier and repeat.

The stretch can be performed as a partner assisted stretch.

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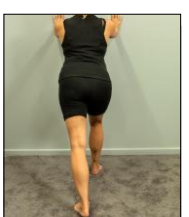
LOWER LEG

Gastrocnemius
Origin: Posterior condyle of the femur
Insertion: Calcaneus via Achilles tendon (Calcaneal tendon)
Action: Plantar flexion of ankle, assists knee flexion(Can not do both fully at same time)

Soleus
Origin: Posterior surface of the head and upper ¼ (angle) of the tibia, middle ⅓ of the medial border of the tibia, tendinous arch between tibia and fibula
Insertion: Calcaneus via the Achilles tendon
Action: Plantar flexion of the foot at the ankle

Potential Muscles Influenced:
- Gastrocnemius
- Soleus
- Tibialis anterior, (Semimembranosus
- Plantaris
- Peroneus longus, brevis,Tertius
- Flexor hallucis longus
- Extensor digitorum longus/brevis
- Tibialis anterior



Steps: Fig 1
1. Standing, with your hand placed against wall.
2. Right leg will be placed 30-60cm from wall with bent knee, left leg will be placed 30-60cm behind right with leg straight.
3. Keep left heel on the ground with even weight distributed through the foot and lean your chest to the wall.

Steps: Fig 2
1. Client lies prone with knee flexed to 90 degrees(tubicles saleus)
2. Therapist places one hand around ankle/heel and one hand on client's foot with forearm resting on side of foot.
3. Client dorsiflexes to point of first resistance.

Steps: Fig 3
1. Client seated on floor with leg outstretched.
2. Client dorsiflexes foot toward knee.
3. Therapist is in a comfortable position and places both hands around arch of foot.
4. Client dorsiflexes with aid of therapist.

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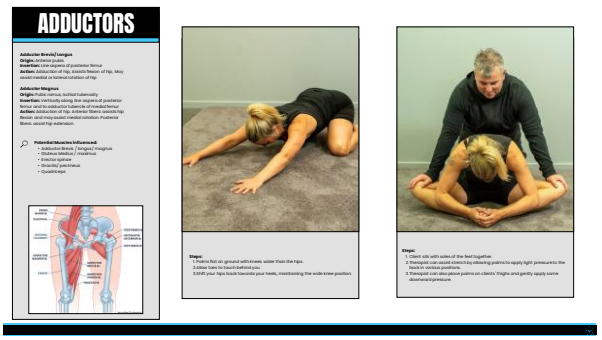

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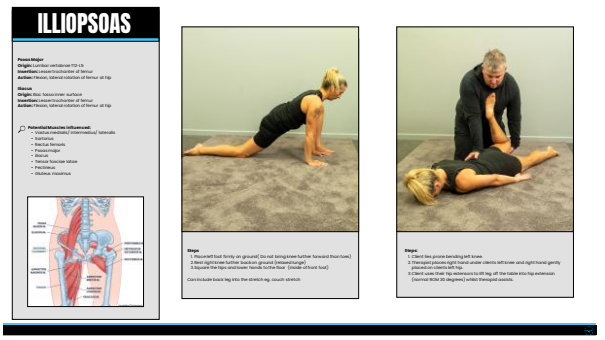

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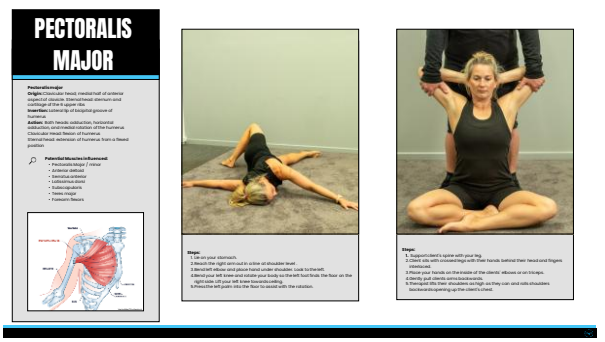

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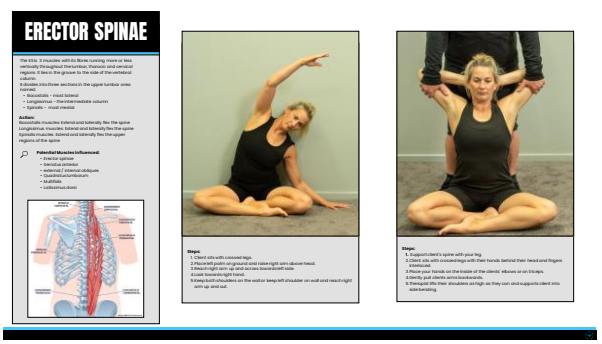

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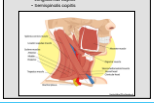
THE NECK

Scalenes
Origin: Anterior: Anterior aspect of transverse processes of C2–C6
Middle: Transverse processes of C3–C7
Posterior: Transverse processes of C5–C7
Insertion:
Anterior: Superior aspect of first rib.
Middle: Upper surface of the first rib behind the subclavian artery
Posterior: Superior aspect of second rib posterior to scalene tubercle
Action: Lateral flexion of cervical spine, elevates ribs during inspiration. Anterior assists neck flexion

Sternocleidomastoid
Origin: Sternal: Anterior aspect of manubrium of sternum. **Clavicular:** anterior superior aspect of medial 1/3 of the clavicle
Insertion: Lateral aspect of mastoid process. Lateral half of superior nuchal line of the occipital bone
Action: Bilaterally: flexion of head and neck.
Unilaterally: rotation of the head to opposite side, assists in lateral flexion to the same side.

Potential Muscles Influenced:
- Upper trapezius
- SCM
- Scalenes
- Splenius capitis
- Longissimus capitis
- Semispinalis capitis



Steps:
1. Sit with back straight.
2. Sit on the left palm and place right hand on the back of the head (crown).
3. Guide the head down towards right shoulder

Position of head will determine which muscles are stretched.
eg. head down / head backward / rotated

Steps:
1. Client sit's with back straight.
2 Client sits on the left palm and therapist places right hand on the back of the head (crown) and left hand on client's upper trap/shoulder.
3. Therapist guides the head down towards right shoulder

Position of head will determine which muscles are stretched.
eg. head down / head backward / rotated

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WORLDS BEST STRETCH ?

Potential Muscles Influenced:
- Flexor digitorum
- Brachioradialis
- Biceps
- Triceps
- Deltoids
- Trapezius
- SCM
- Scalenes
- Pectoralis major
- Serratus anterior
- Vastus lateralis
- Gluteus maximus
- Bicep femoris
- Gracilis
- Rectus femoris
- Semitendinosus
- Gastrocnemius
- Flexor digitorum longus
- Soleus
- Tibialis anterior
- latissimus dorsi
- Rhomboids
- Erector spinae
- levator scapulae

Steps:
1. Begin in the plank position
2 Step left foot forward to be inline with left hand but placed on the outside of left hand.
3 Maintain lunge position and lower right forearm to floor (bent to 90 degrees)
4 Reach right hand up to the ceiling and rotate through thoracic spine
5 Your head should follow the arm and your arms forming a straight line.
6 Return to starting position.

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WHAT HAS BEEN INFLUENCED:

Muscle:
- Gluteus maximus/medius/minimus
- Piriformis
- Gemellus superior/inferior
- Obturatus externus/internus
- Quadratus femoris
- Latissimus dorsi
- Bicep femoris
- Semitendinosus / semimembranosus
- Gastrocnemius / soleus
- Tibialis anterior / posterior
- Erector spinae
- Adductor Brevis / longus/ magnus
- Gracilis/ pectineus
- Quadriceps
- Serratus anterior
- External / internal obliques
- Quadratus lumborum
- Pectoralis Major / minor
- Subscapularis
- Teres major
- Forearm flexors
- Flexor digitorum
- Brachioradialis
- Biceps
- Triceps
- Deltoids
- Trapezius
- SCM
- Scalenes
- Vastus lateralis
- Bicep femoris
- Gracilis
- Rectus femoris
- Flexor digitorum longus
- Soleus
- Rhomboids
- levator scapulae
- Multifidis
- Vastus medialis/ intermedius / lateralis
- Sartorius
- Rectus femoris
- Psoas major
- Iliacus
- Tensor fasciae latae
- Pectineus
- Semispinalis capitis
- Splenius Capitis
- Longissimus capitis
- Diaphragm
- Occipital
- Plantaris
- Peronaeus longus brevis/tertius
- Flexor hallucis longus
- Extensor digitorum longus/brevis
- Tibialis anterior

Muscles have been influenced by either:
- Shortening with tension
- Shortening without tension
- Lengthening with tension
- Lengthening without tension
- Held without motion

Fascial lines:
- superficial back line
- superficial front line
- lateral line
- deep front line
- spiral line
- functional lines
- back arm lines
- front arm lines

Other:
- Nervous system
- Mood
- Thoughts
- Breathing

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MOVEMENT SPECIFIC

Action: Can be movement or sport specific

Assessment: Look for restrictions within the movement pattern

Considerations:
- Isometrics can be applied
- Caution to joint positions
- What is the desired outcome
- Test and Re-test

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THE BREATH

The average human takes approximately 22,000 breaths a day or 8,030,000 per year.

But are we breathing efficiently and the most effective way for our own body.

Our breath, is fundamental to the functioning human body.

Breathing is after all, a symbol of life.

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DYSFUNCTIONAL BREATHING

The presence of dysfunctional breathing (DB) does not reflect an individual's level of cardiovascular fitness. Sub-optimal breathing during rest also means sub-optimal breathing during exercise. Research has linked dysfunctional breathing (DB) to a host of health conditions, including lower back pain and neck pain. It has also been proven to adversely affect the musculoskeletal system. (Kiesel et al.,2017).

A large portion of the population are over breathing(Hyperventilation)

Signs of dysfunctional breathing:
- Mouth breathing
- Upper chest movement
- Hearing breathing during rest
- Frequent sighing
- Frequent yawning
- Easily noticeable breathing movement during rest
- Tired
- Snoring
- Waking up with a dry mouth

TESTING: High / Low test and the BOLT Test

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FUNCTIONAL BREATHING

BIOCHEMICAL	Addressing blood sensitivity to carbon dioxide. The exchange and metabolism of oxygen (O_2) and carbon dioxide (CO_2)
BIOMECHANICAL	Breathing from the diaphragm. The physical aspects of breathing; the functioning of the respiratory muscles, including the intercostal muscles and diaphragm.
CADENCE	Reducing the respiratory rate to between 4.5 and 6.5 breaths per minute in order to influence the autonomic functioning of the body.

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NASAL BREATHING

As the nostrils are significantly smaller than the mouth, breathing through the nose creates approximately 50 percent more resistance compared to mouth breathing during wakefulness, resulting in a 10 to 20 percent greater oxygen uptake in the blood.

Healthy nasal breathing is vital. It allows the body to utilize nitric oxide and carbon dioxide in the blood to expand the blood vessels.

As a breath is taken in through the nose, nitric oxide will follow that airflow down into the lungs for the purpose of increasing the amount of oxygen uptake in the blood. The nitric oxide then follows the airflow to the lungs, where it serves several very important roles, including the opening of the airways and increasing oxygen uptake in the blood (Lundberg, 2008).

Nasal breathing: more likely to breathe deeper into the lungs. Nasal nitric oxide: redistributes blood throughout the lungs. Improves ventilation perfusion to improve oxygen uptake in the blood.

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NASAL BREATHING

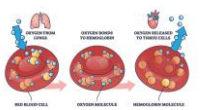
Once the oxygen is in the blood, we need to have a substance called hemoglobin to carry the oxygen around our body.

Hemoglobin is a protein in red blood cells that carries oxygen from the lungs to the body's tissues.

Christian Bohr (1904) discovered that CO_2 facilitates the release of oxygen to the cells, known as the Bohr Effect.

Bohr discovered that CO_2 acts as a catalyst for hemoglobin to release its load of O_2 for use by the body.

When CO_2 levels in the blood are low, the bond between O_2 and hemoglobin increases, this means the body cannot access the O_2 in the blood and it leads to poor body oxygenation.



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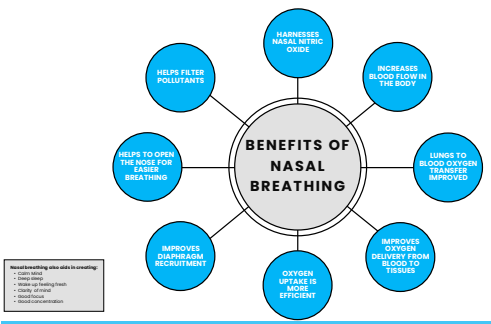

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MOUTH BREATHING

Mouth breathing causes changes in the acidity of the blood.
Mouth breathing depletes blood carbon dioxide.
This can cause blood pH to increase, leading to respiratory alkalosis.
Respiratory alkalosis means the blood is too alkaline.

Its symptoms include:

- Detrimental changes in the nervous system
- Alterations in physical and mental states
- Problems in the musculoskeletal system
- Poor oxygenation of tissues and organs
- Increased pain perception
- Constriction of the blood vessels
- Development of myofascial trigger points

Each of these symptoms on its own can change the normal motor control of skeletal muscles.

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LIGHT - SLOW - LOW

Benefits of nasal breathing:
Increase O_2 uptake and delivery, recruitment of diaphragm, improve CO_2 tolerance. Nitric Oxide intake.

Benefits of light breathing:
Increase blood flow and O_2 delivery, improve CO_2 tolerance, reduce perception of breathlessness.

Benefits of slow breathing:
Engages the diaphragm and improves alveolar ventilation.
Connection to the vagus nerve.
Calms the nervous system because slower exhalations activate the PNS.

Benefits of breathing from diaphragm:
Improve recruitment of diaphragm for stabilization of the spine, induce state of calmness.

BREATH SLOW
Activate the relaxation response

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OXYGEN BOOST

This exercise helps to normalize breathing biochemistry.

You are reducing the volume of air you are taking into you body to create a tolerable air hunger, achieving this signifies that CO_2 has accumulated in the blood. CO_2 is a catalyst for the release of oxygen from the red blood cells.
With light and soft breathing, the blood vessels open, and more oxygen is released from the red blood cells to feed your tissues and organs.

Benefits:
- Oxygen uptake and delivery
- Harnesses nasal NO and reduces sensitivity to CO_2 accumulation
- Connects mind to breath
- Improves concentration

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FEELING STRESSED

By holding the breath for short periods, nitric oxide(NO) stores in the nasal cavity and carbon dioxide(CO_2) slightly increases in the blood.
When you resume inhaling you carry NO from the nasal cavity to the lungs.
This allows for the opening of the airways, improvement of blood circulation and allowing more oxygen to be transported to the cells.

Benefits:
- Reduce stress
- Reduce asthma symptoms
- Ideal warm up

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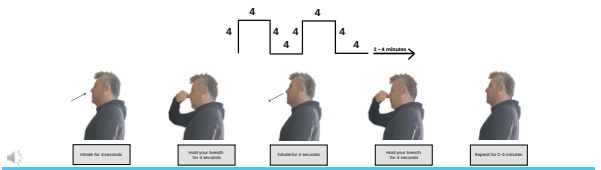
FOCUSED AND CALM

Box Breathing is a breathing technique used by the military to create a relaxed state of readiness and get in the zone.

- It reduces stress
- It is a great mood booster
- Creates a focused mindset

Good Stress helps the body to adapt



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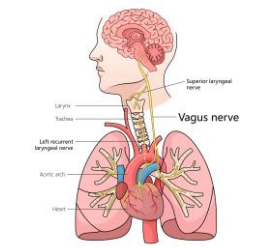
VAGUS NERVE

The vagus nerve is **one of 12 cranial nerves in the body**. It's responsible for various bodily functions, including digestion, heart rate, and breathing.

Slow breathing techniques seem to promote a predominance of the parasympathetic autonomic system with respect to the sympathetic one, mediated by the vagal activity.

Slow breathing:
- Vagus nerve stimulated
- Heart slows down
- Slowing of the HR is communicated to the brain
- The brain interprets body as being safe
- Brain send signal back to the body

Dr Singh (2017) discovered that CO_2 stimulates the vagus nerve. He discovered that increased CO_2 in the blood could activate the vagus nerve and slow the heart rate.



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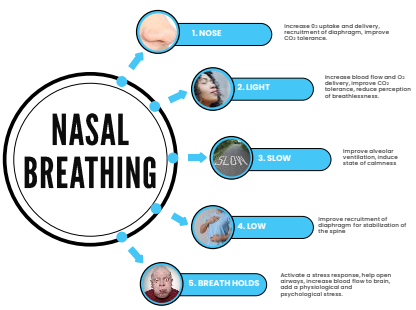

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RESEARCH

BREATHING AND MOVEMENT

Bradley and Esformes(2014) conducted a study on the relationship between breathing pattern disorder and functional movement.

- They defined functional movement as the ability to produce and maintain sufficient mobility and stability along the kinetic chain while accurately and efficiently completing fundamental movement patterns.
- They used the FMS test to measure movement ability.

Their results:
Their research showed a correlation between breathing pattern disorders and functional movement, as subjects with poor breathing patterns scored lower of the FMS test. In total, 87.5% of those who passed the FMS test were classified as diaphragmatic breathers.
The results demonstrate the importance of functional breathing patterns for functional movement.
(Bradley and Esformes, 2014)

Chapman et al., new neural connections can be made in order to correct or re-educate disordered breathing patterns and restore the central nervous system's normal motor control patterns.
"If breathing is not normalized, no other movement pattern can be" **(Chapman et al., 2016)**

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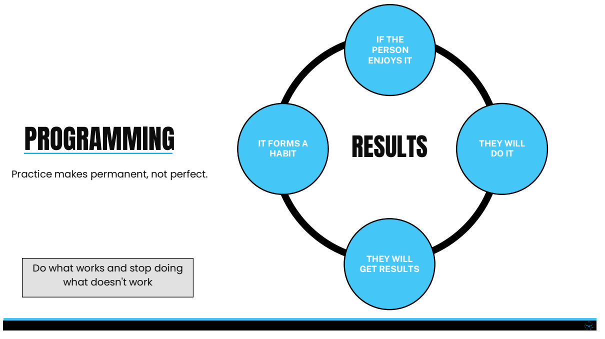

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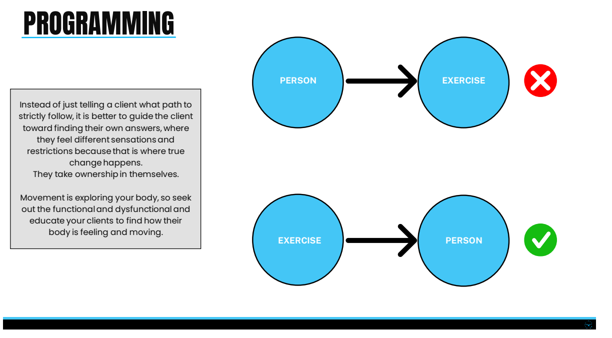

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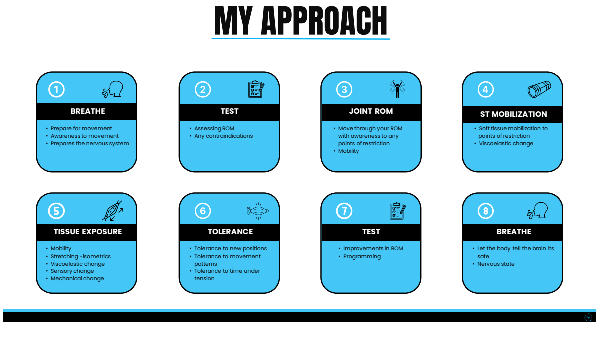

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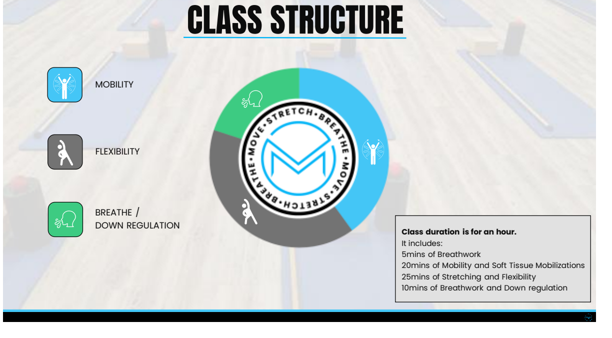

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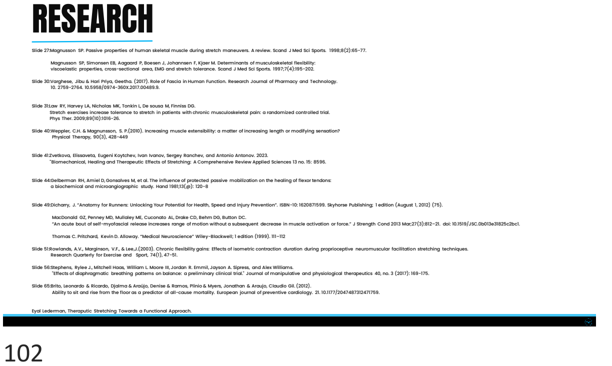

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