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Thesis paper.

Program: BSc OST.

Year: 3

Semester: 1

Date of submission: 24.11.2020.

Basic principles of Sports Medicine and how they relate to Osteopathic Medicine

Word count: 2802.

Introduction

In this essay we are going to discuss how Osteopathy relates to Sports Medicine, including to the concepts of muscle imbalance, motor control, core stability, muscle slings and how Osteopathy address and relate to those concepts using the most up to date research available.

Sports Medicine

Sports medicine does not in itself constitute a medical specialty. Most healthcare providers in sports medicine are certified in internal medicine, emergency medicine, family medicine, or some other specialty like Physical Therapy, Osteopathy or Physiotherapy. (Rochester, 2020).
They are then given further education. Others are specialized in treating children and adolescents with injuries whose growing bodies can be quite different from those of adults. They are typically board certified in paediatrics or family medicine, with additional sports medicine education.
Most, but not all, health care providers in sports medicine do have surgical experience, usually as orthopaedic surgeons.
Sports medicine healthcare specialists are given special training to restore function to injured patients so that they can function as quickly as possible again.
They are experts in the prevention of illness and injury among the active population.
Healthcare providers for sports medicine also consult with professional athletes.
But they also treat children and teenagers involved in sports, as well as adults who perform personal fitness. (Rochester, 2020)

Sports Medicine specialists treat conditions like:
Back and neck pain, bursitis, ligament injury, tendinopathy, rotator cuff injury, plantar fasciitis, hamstrings tear, meniscus injury, lateral or medial epicondylitis, ankle sprains.

Sport injuries [online image] Available at: https://sportswave.ca/amateur-sports/sports-injuries-be-vigilant/ (Accessed 27 October 2020)

Osteopathy in Sports Medicine

Sports injuries are common, in particular, with contact sports activities where bruises and traces are section and parcel of day-to-day life. The nature of sports activities nowadays is so intense and frantic that accidents are nearly inevitable; to tackle this, osteopathy has emerged as a vital part of the condition process; for example, the range of sport clubs availing of an Osteopath has improved appreciably in recent years. Professional sports gamers depend on Osteopathic therapy as a means of maintaining their own bodies in top of the line physical form as well as a way to heal or ease current conditions. Common sports activities injuries consist of strains and sprains, which have an effect on the tendons, muscle mass and ligaments as well as swelling, bruising and areas of muscular pain or aching. (Sports Medicine Information,2009)

What is Osteopathy?

Osteopathy is a method of analysis and remedy in a broad variety of clinical conditions. It works with the shape and feature of the physique and is primarily based on the precept that the well-

being of a person relies upon on the skeleton, muscles, ligaments and connective tissues functioning fluently together.

To an osteopath, for your physique to work well, it needs to work as a unit. So, Osteopaths work to fix your physique to its balance, without the use of pills or surgery. Osteopaths use touch, and musculoskeletal manipulations to enhance the mobility of joints, to relieve muscle tension, to increase the blood and nerve impulse to tissues, and to help your body's own recuperation mechanisms. They can also also grant recommendation on posture and workout to promote recovery, health and prevent signs and symptoms recurring. (General Osteopathic Council, 2020)

Osteopathy [online image] Available at: https://www.livinghealth.ie/physiotherapy-2/osteopathy-2/ (Accessed 27 October 2020)

Osteopathic principles

• The body is a unit, and the human is a mixture of body, mind and spirit.

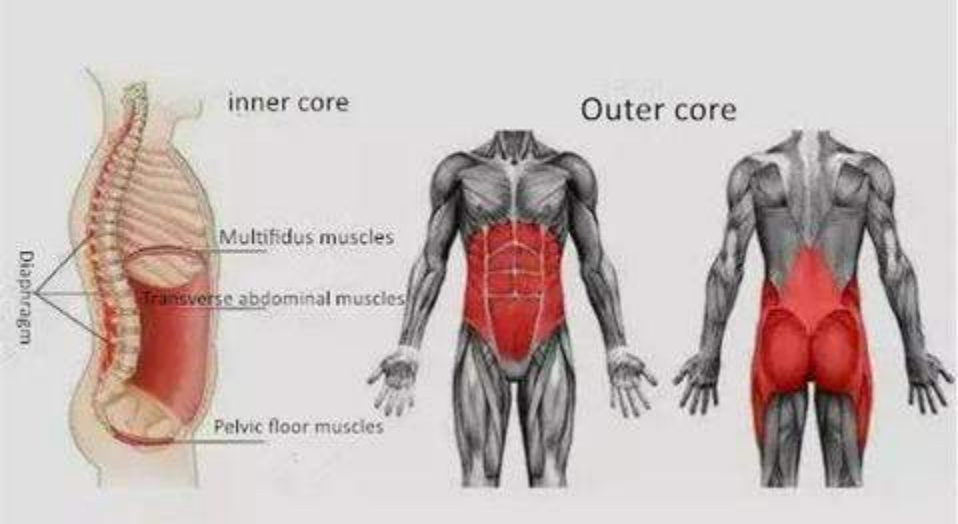
• The body has it's own capacity for self-regulation, self-healing and maintenance of health.

• Structure and function are interrelated.
• Rational therapy is based on the interpretation of all the above principles: body cohesion, self-regulation and the interrelationship between form and function. (Kansas City University,2020)

Core Stability

Core stability relates to all four Osteopathic principles. Core stabilization plays a crucial role within the regulation of postural stability, which is required for coordinated dynamic movement. Core stability is achieved by coordinated co-activation of the transverse

abdomen (TRA), internal obliques, external obliques, rectus abdomens, pelvic floor muscles, multifidus, and diaphragm. Unconscious or subconscious activation of those muscles generates intra-abdominal pressure or tension in conjunction with breathing, this leads to stabilized and upright neutralized spinal posture during dynamic movement. Impaired core stabilization may end in low back pain (LBP) or other musculoskeletal spinal injuries during dynamic lifting movements. Empirical evidence suggests that within the absence or lack of core stabilization, neuromuscular stabilizing forces are unbalanced, leading to unevenly distributed spinal loads. This leads to LBP and spinal alignment deformities (i.e., lordosis, scoliosis, and kyphosis), and should explain why individuals with core instability are susceptible to spinal pathology. A legitimate and reliable core stabilization test that accurately and consistently quantifies core instability is important. (Young et.al, 2017)



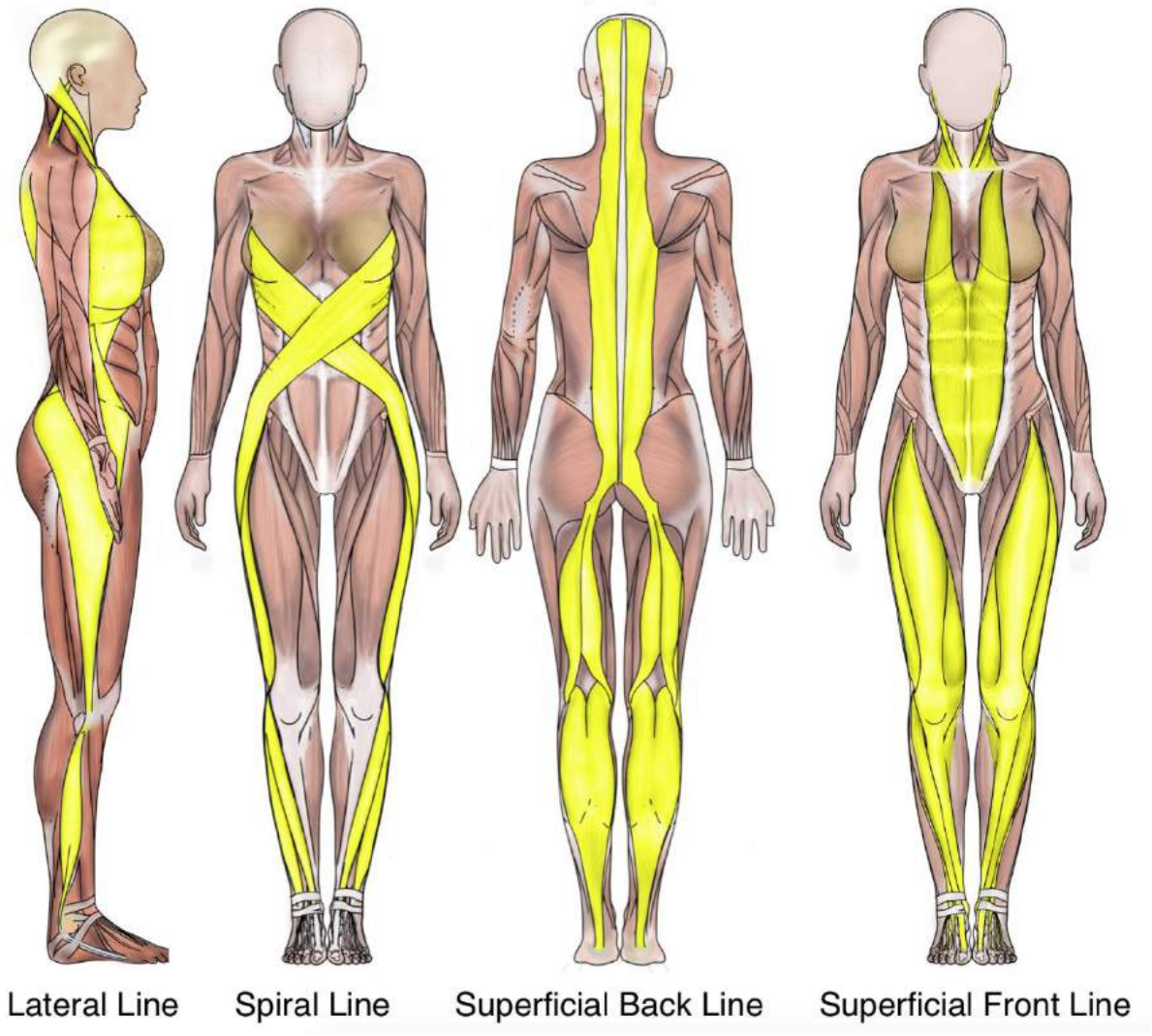
The core [online image] Available at: https://belloyoga.com/blogs/news/a-yoga-ball-to-get-your-core-stability-training (Accessed 27 October 2020)

Muscle slings

Muscle slings relate to all Osteopathic principles. (Samarzija, 2020). The dynamic movement of our body results from superficial muscle activity resulting from different deep muscles cooperating with one another. Myofascial slings also are referred to as anatomy slings and are linked very closely to superficial muscle activity. The term, anatomy slings, was first mentioned by Vleeming, while the term myofascial was described as a group of structures within a sling. Anatomy slings aren't only one sort of tissues, they involve fascia, muscles, and ligaments that are interconnected with other and supply stability and mobility to the body. For this exact reason, it's important to know how fascia is connected with one another and helps the body to function.
Most people don't know but the force produced by a contraction in our muscles spread across its origin. The force is transferred to other structures within the myofascial sling, making it possible for the force to travel far away from the first point of

the contraction. This is often called the force vector. The muscles are interconnected within the myofascial sling via fasciae. As an example , the transfer of force within the pelvis and lumbar spine is one such example of how myofascial slings transfer force from their origin to other parts of the body.
For the optimal alignment of the bones, the force vectors got to be balanced as imbalanced vectors could cause a tension within the myofascial slings, resulting in loss of stability and misalignment.
Our body is formed from many of those myofascial slings and it's necessary that each one of those slings are working harmoniously. They assist us move better and have more speed. (Moody**,** 2017)

The anterior oblique system (AOS) consists of the external oblique and internal oblique, connecting with contralateral adductor muscles via the adductor-abdominal fascia. When this group of muscles contract together, it provides stability by acting like an abdominal binder, compressing the whole pelvis, leading to force closure of the symphysis pubis. When working interchangeably with the opposite AOS, and consonant with other slings, it'll also cause relative movement of the pelvis.
The gluteus has evolved from a comparatively small muscle (as observed in chimpanzees) to being the most important muscle within the body. It's become a part of a system which is specialised and integral in supporting functional control in movements like human gait – the posterior oblique muscle sling (POS).
(Physiopedia, 2020)



The sling system [online image] Available at: https://www.pinterest.ru/pin/AcQSMhGPxdNUNVsAjywr2X8mvE5lmvcafyvlfHSg9vVHh6RN2m5KEfU/ (Accessed 27 October 2020)

Muscle Imbalance

Knowing the normal function of muscles will give you a clearer understanding of the irregular as well. In active and inactive individuals alike, the most common dysfunctional muscle condition is muscle imbalance, which happens when two or more muscles do not contract and relax as they should. Neuromuscular imbalance is referred to as this form of problem.

Using the above example, imagine that the biceps remained tight and the triceps remained loose even after you relaxed your hold on your thigh, when you contracted the biceps and the triceps got loose. This is very much like a muscle imbalance disorder, except that all muscles are in an unnatural state.

A muscle that remains too relaxed (although this is not true fatigue, which refers to the lack of power) is referred to as abnormal inhibition and often called "weak". This portion of the muscle imbalance can be comparatively mild, causing moderate or in some circumstances, serious weakness to the point of causing significant discomfort in the muscle-controlled joint. In most cases, this inhibition allows the opposite muscle, a disorder called pathological facilitation, to become too tight. Together the joint(s) they control, the tendons they are connected to and other joints, ligaments, bones, and body regions (such as the pelvic, back, or head) all around may adversely influence these irregular muscles. It will also cause a stance mismatch and an erratic gait. The broad continuum of muscle activity, with average in the centre, varies from extreme fatigue to extreme tightness. The extremes are generally due to damage to the brain or spinal cord; normally people with cerebral paralysis, multiple sclerosis, or who have had a stroke have some kind of fatigue and tightness of the muscle.

The growth of muscle imbalance can happen as follows:

The abnormally inhibited muscle is lengthened and is therefore the starting point for certain typical physical ailments, such as slipping or twisting your foot, that are not exacerbated by trauma. This weakness of the muscles itself is also quiet. You can however, feel the loss of function created by it, such as something when moving that is not right in the knee joint. And as the muscle does not regulate the action of a neighboring joint correctly, it ultimately allows the portion of the body to become inflamed. Trauma may result in the same irregular muscle inhibition, from a mild, seemingly harmless muscle strain, or a major hit or fall that actually injures the muscle. Tightness (abnormal facilitation) is the other side of abnormal muscular inhibition. It also happens when the body compensates for an irregular suppression that has recently taken place. This tight muscle is sometimes visibly uncomfortable and often painful, and by limiting dexterity, it can hinder mobility. Tight muscles are shortened, making them candidates for moderate, sluggish stretching, although this will address the secondary issue in most situations, as the weak (inhibited) muscle is typically the cause. Furthermore, you risk weakening the blocked muscle more (because it's still over-stretched by trying to relax the rigid muscles by stretching (which is not recommended).

Two Muscle Imbalance Forms

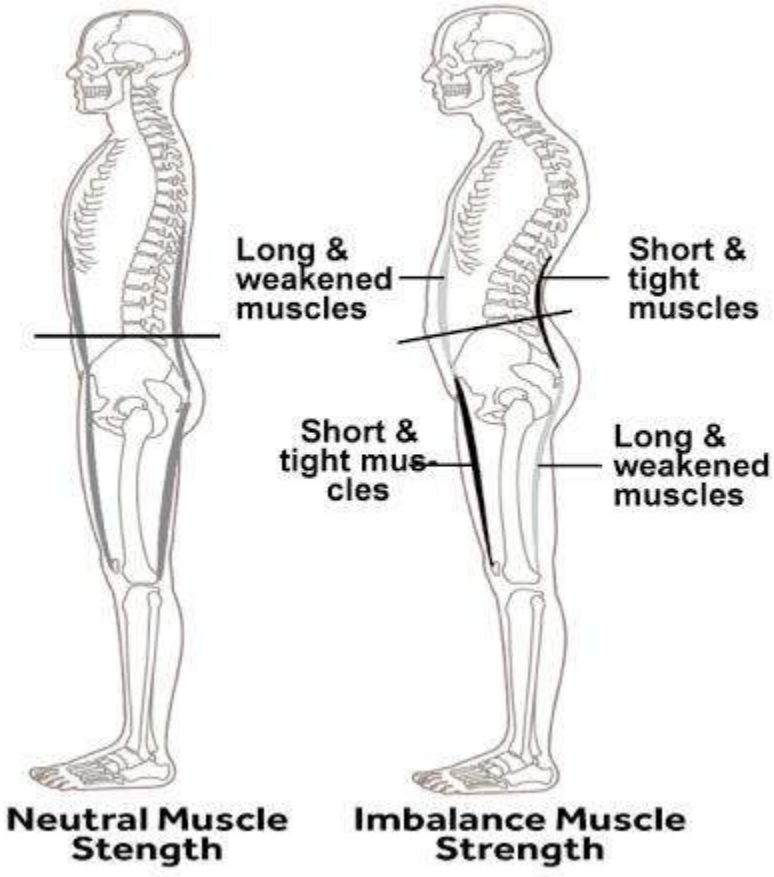
The term muscle imbalance is frequently used today by health-care providers, sports coaches, and athletes. Sadly, there is no consensus about how muscle imbalance is characterized.

At least two different kinds of muscle imbalance exist:

Neuromuscular imbalance has been discussed above and covers the full continuum from the muscle itself to the brain and nervous system. Exercise mismatch is normally a concentrated muscle phenomenon, usually because one muscle or group operates more more than another; or in everyday life, one muscle or group requires much less than another. (This is not to suggest that

the brain and nervous system do not play a part in muscle exercise, just for simplicity, the word "neuromuscular" differentiates the two kinds of muscle imbalance.)

(Maffetone, 2015)



Muscle imbalance [online image] Available at: http://www.owellbodycare.com/muscles-imbalances-can-result-chronic-back-pain (Accessed 27 October 2020)

Motor Control

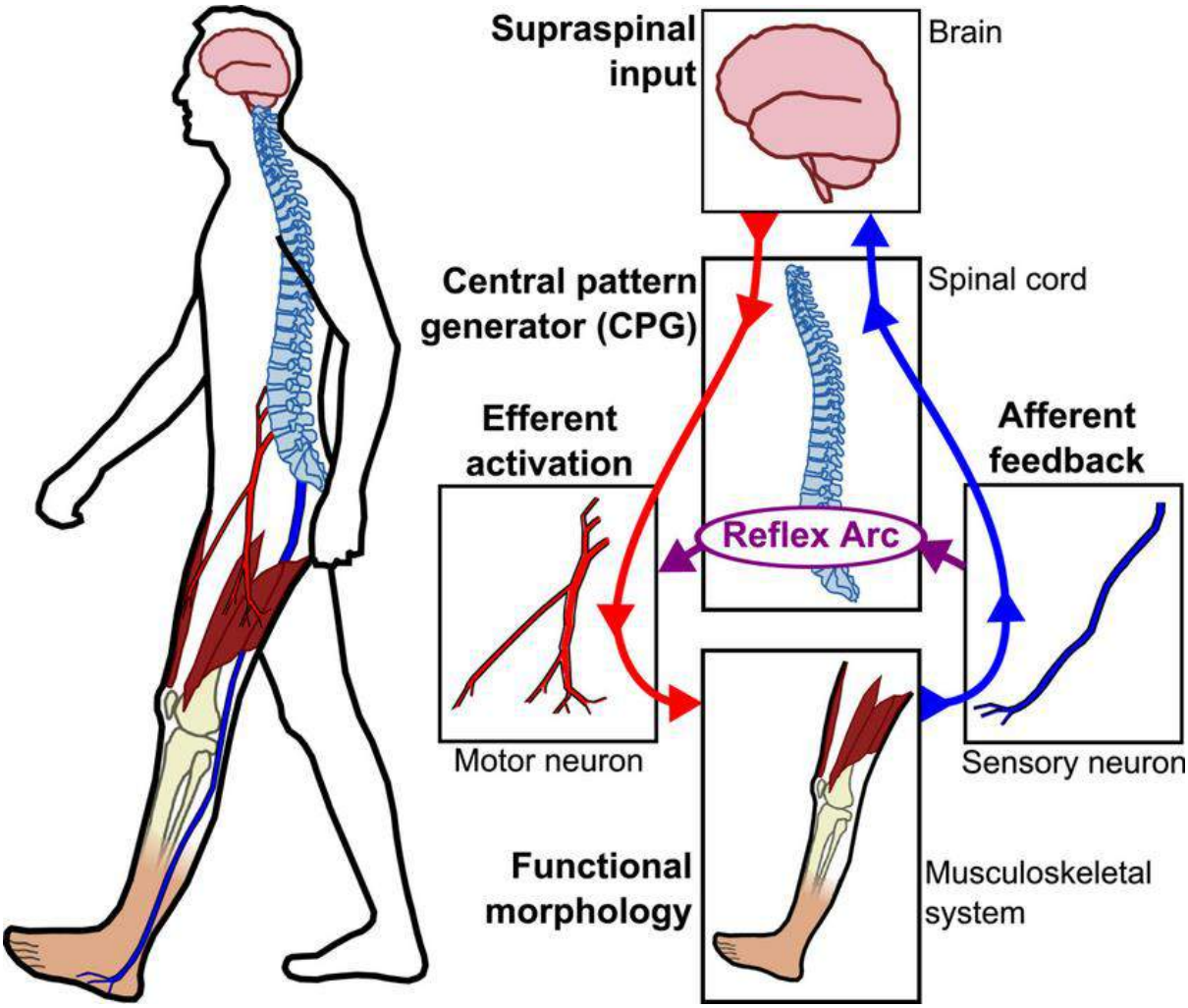
Motor control relates to the first and third Osteopathic principles.

Motor control may be a broad term that describes the overall ability of an individual to initiate and direct muscle function and voluntary

movements. Control may be a concept that's distinct from the various smooth muscle actions of the body, like shivering when cold or flinching when an object is directed at an individual all of sudden. A related expression, "motor skills," refers to the power to perform specific physical movements; control is additionally the acquisition and development of a series of distinct motor skills.

Motor control is split into two subsets. Gross control is that the ability of a person's to maneuver an outsized muscle group or segment of the anatomy; the waving of an arm is an example of this sort of movement. Fine control is that the ability to control precise movement, like handwriting. All control is an integrated product of three aspects of the human anatomy: muscles, bones, and therefore the central nervous system.

Every healthy person are going to be capable of both gross control and fine control. In many sports, athletic success is measured within the fine distinctions between athletes in terms of their coordination (particularly their hand-eye coordination), balance, and overall body control. Many aspects of control are hereditary; others are linked to the somatotype of the individual. (Enciclopedia.com, 2020)



Motor control [online image] Available at: https://www.researchgate.net/figure/Nominal-sensory-motor-control-loop-for-human-locomotion-Motion-intentions-originate-from_fig1_270508342 (Accessed 27 October 2020)

Clinical log book **Date: 22.11.20.** **Observed** □ **Treated** □ **Yes.** **Patient front sheet included**? □ **No**

Number:	Sex: Male Occupation: Orthopaedic therapist	Age 38	Area treated L forearm, L wrist, mid. TSP

Hypothesis

1. Facet lock T4-T8
2. Spasm of the intercostal muscles
3. Scaphoid non union fracture
4. Elevated 5th and 6th rib R

Red Flags □No

What and Why? Patient was sent for an X-Ray of the rib cage and lungs by his GP. The results ruled out any damage or ongoing condition with the lungs.

Examinations to support hypothesis:

TSP: Compression test, irritation test, thoracic mobility testing, static joint play.

L wrist: Palpation, compression test, tuning fork on scaphoid, static joint play.

Diagnosis:

Facet lock T4-T6.

Wrist joint irritation due to thickening of healed fractured scaphoid L.

Treatment and patient advice

STW: LSP, TSP, Traps, CSP, L forearm, L arm, L Deltoid.

TENS: TSP, L forearm.

Dry needling: T3-T7 BL, L forearm, Traps BL, OA BL, DLJ BL, L5-S1 BL.

HVT: T4-T6 R, OA R, C3-C6 L.

Mobilizations: L shoulder, TSP, CSP.

MET: TSP, CSP, L wrist

Advice: Heat on TSP, ICE on L wrist. Assessment in 7 days time.

Ongoing treatment progression Continue with DTW on TSP and CSP. DTW on L wrist flexors/extensors for the next four treatments. Gradually increase myofascial work and cross friction on L wrist to brake down adhesions. By TTT 4, introduce stretching (flexion, extension, side bending BL) and light mobilization exercises for the wrist. Home advice: Rest from activities that aggravates the symptoms. Heat on TSP, NSAID's for the wrist (prescribed by his GP). Cat stretch, side lying rotations for the TSP.

Clinical log of patient presenting with pain in thoracic region and left wrist, secondary to RTA (road traffic accident) on his motorcycle in May 2020.

In the above clinical log we can observe how the Osteopathic principles have been applied to the patient.

The first principle, "The body is a unit", has been applied while screening the patient and assessing site of pain, associated symptoms and performing the relevant examinations. But also during treatment, where above and below segments were treated and not only the effected areas, trying to assess muscle spasms causing and therefor adressing **muscle imbalance**.

The second principle, "The body has it's own capacity for self-regulation, self-healing", has being applied into the home advices given to the patient about rest, ice, heat and exercises that address **muscle slings**.

The Third principle, "Structure and function are interrelated" has being followed by applying spinal manipulations ad mobilizations which addressed **motor control**, restoring range of movement, efferent activation and afferent feedback.

The fourth principle, "Rational therapy is based on the interpretation of all the above principles" has being followed by incorporating exercises in that will promote a faster rate of rehabilitation by also incorporating **core stability**.
Kansas City University (2020)

Conclusion

Osteopathic medicine is a method of analysis and remedy in a broad variety of clinical conditions. It incorporates the principles of sports medicine, as Osteopaths restore function to injured patients as other sports medicine practitioners. Osteopathy takes in consideration the principles of muscle slings, core stability, motor control and muscle imbalance, as they are all already incorporated in the four principles of Osteopathy.

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