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Abstract #1

The Effects of Mobilizations With Movement (MWMs) on the Shoulder Range of Motion and Strength

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Context: It is well documented that mobilizations with movement (MWMs) are effective in improving range of motion and pain

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measures. There is however a lack of literature examining whether the effects of this treatment are short lived, or are sustained over time. Furthermore, there is a lack of literature examining more functional outcome measures such as strength which is performance relevant. The current literature is limited to the treatment of lateral epicondylitis where grip strength improvement was reported after a MWM application. This research intends to document the acute and sustained effects of MWMs on shoulder internal and external rotation range of motion and strength.

Methods: Thirty-five collegiate athletes volunteered to take part in this study. The participants had a restricted range of motion (<60°) of internal shoulder rotation. Each participant was required to attend five testing sessions. During the first testing session, the participants were familiarised with the study protocols, including the shoulder strength and range of motion measurements. Baseline internal and external rotation ROM (degrees) and strength (peak torgue/body weight percentage) measures were obtained on the second visit using an inclinometer and the isokinetic Biodex system 3 respectively. The participants were randomly stratified into groups based on their baseline shoulder strength measures; therapist applied MWM group (N = 13), self-applied MWM group (N = 12) or the control group (N = 10). The participants received treatment on the shoulder joint based on their respective group. Shoulder range of motion and strength measures were reassessed immediately following the treatment application. The outcome measures were reassessed again 24h and 48h after the initial treatment.

Results: A SPANOVA revealed a significant time effect indicating a change in IR ROM between the time points (F = 13.85 [df = 3, SE = 25], $p=0.000,\ \eta_p{}^2=0.624$ with the observed power of 1.0). Post hoc analysis revealed that the SMWM group has a significant increase of 7.2°±2.1° in IR ROM immediately post treatment (p = 0.006, 95% confidence interval, 1.78-12.64) when compared to the control group, however the MWM group showed no significant difference. The SMWM and MWM groups had no significant effect on ROM 24hours and 48hours post treatment. The statistical analysis revealed no significant difference in the ER ROM between time points (F = 0.331[df = 6, SE = 52], p = 0.917, η_p^2 = 0.97 with the observed power of 0.13). A SPANOVA demonstrated no statistical difference in ER peak torque/body weight (Nm.Kg⁻¹) $[F=1.78~[df=3,~SE=22],~p=0.179,~{\eta_p}^2=0.196$ with the observed power of 0.40 at 60°/sec and $F=1.35~[df=3,~SE=22],~p=0.28,~{\eta_p}^2$ = 0.15 with the observed power of 0.39 at 180°/sec] and IR peak torque/body weight (Nm.Kg⁻¹) [F = 0.976 [df = 3, SE = 22], p = 0.42, $\eta_p^2 = 0.118$ with the observed power of 0.32 at 60°/sec and F = 2.80 [df = 3, SE = 22], p = 0.063, $\eta_p^2 = 0.27$ with the observed power of 0.594 at 180°/sec] at 60°/sec and 180°/sec at any of the time points.

Conclusions: The study concludes that SMWMs are more effective than MWMs in increasing IR shoulder ROM. However, this effect is not sustained over time. The application of MWMs and SMWMs has no effect on ER ROM and it was determined that MWMs do not have an effect on the shoulder strength.

Abstract #2

Treatment of Low Back Pain in Athletes Who Perform Training With Global Electrostimulation Through Fasting

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Introduction: Low back pain is one of the most common pains, 8 out of 10 people will have low back pain throughout their lives. In athletes, we found that low back pain has a prevalence of 1% to 30%, corresponding to 10-15% of all sports injuries. The etiology of

low back pain is multifactorial and its treatment is multidisciplinary. We found that, with conservative therapy, 79% of athletes with low back pain due to disc herniation returned to compete at 4.7 months, 85% of those treated with surgery between 5.2 and 5.8 months. Chronic low back pain along with insulin resistance may have an impact on the fascia, affecting the extracellular matrix and may lead to increased action of fibroblasts, triggering a fibrosis process, in addition to degrading collagen and elastin fibers, which are fundamental components of the fascia in this case on the thoracolumbar. The aim of our study was to establish the impact of intermittent fasting on athletes training with global electrostimulation.

Methods: A prospective, experimental and longitudinal study was conducted. 16 athletes who trained with global electrostimulation were divided into two groups: a control group (n = 8) who continued their training with global electrostimulation and an experimental group (n = 8) who, together with the training, performed a 14 hours night fast. Weight, fat percentage, abdominal perimeter, Oswestry test, concentration test, Schöber test, sclerotome pain and visual analogue scale were evaluated. Those data that fulfilled the normality and homoscedasticity were analyzed with the T Student test.

Results: There was an improvement in the lumbar flexibility measured with the Schöber test (t (16) = 4.24, p = 0.001) with nocturnal fasting compared to the only electrostimulation group. The control group had an improvement in the concentration test (t (8) = 4.54, p = 0.003) and a decrease in the visual analogue scale (t (8) = 4.56, p = 0.003). The fasting group decreased weight (t (8) = 3.06, p = 0.018), fat percentage (t (8) = 6.31, p < 0.001), improved flexibility as measured by the Schöber test (8) = 4.57, p = 0.003). There were no statistically significant differences in sclerotome pain (p > 0.05).

Conclusions: The improvement in EVA in the control group is related to the analgesic aspect that produce the physical exercise as the use of the own electrostimulation, The experimental group did not gain a significant improvement because they started with lower EVA values, in addition, the experimental group presented an improvement in weight, fat percentage and lumbar flexibility, could be due to the anti-inflammatory factor and the improvement of the insulin resistance, rebalancing the values of the fundamental substance, collagen and elastin of the fascia. These results place intermittent fasting as a therapy of choice when treating non-specific low back pain, so that it is a noninvasive therapy. However, further studies are needed to determine the impact of intermittent fasting on myofascial lesions.

Abstract #3

Biomechanical Factors of the Lower Limb Related to Running Injuries: A Systematic Review

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Context: In the last decades running has become the sport of choice for many, because of its convenience, health benefits, and economical nature. The incidence of running injuries is high, result from a combination of extrinsic factors (training errors, shoe issues, running surface) and intrinsic factors (poor flexibility, muscle weakness, anthropometry...), the individual biomechanics is considered one of the intrinsic factors to explain the origin of running related injuries.

Objective: To analyse the biomechanical factors which are involved in running related myofascial injuries in regular runners compared to non-injured runners

Data Sources: An electronic database search was carried out using four different databases: Medline, Dialnet, ScienceDirect and Emerald.

Study Selection: The following search terms were used: running, injury, kinematics and biomechanics.

Data Extraction: All of the studies had to meet inclusion criteria: 1) only research papers (case reports, reviews, editorials, letters to the editor were excluded) published between January first 2005 and July first 2015, 2) texts in English or Spanish, 3) only papers that had recreational or competitive runners but not elite in the study population, 4) comparing subjects with a running related injury diagnosed by a healthcare professional and asymptomatic controls without orthopedic issues, 5) all subjects were between the ages of 18 and 45 years, 6) all studies used photogrammetry as instrument to analyse the 3D biomechanics while running, and 7) all of the studies had to include one of the following kinematic variables: hip adduction, hip internal rotation, knee internal rotation and rearfoot eversion. 16 studies were finally considered for the systematic review.

Data Synthesis: Results showed a significant increase of hip adduction during stance phase in runners with patellofemoral pain syndrome, a significant increase in hip adduction and in knee internal rotation in runners with illoitbial band syndrome, a significant increase in rearfoot eversion in runners with achilles tendinopathy and a significant increase in hip adduction and in rearfoot eversion angles in runners with tibial stress fracture or medial shin pain.

Conclusions: There is an acceptable evidence that runners with patellofemoral pain syndrome or medial shin pain have a significantly greater hip adduction during running stance phase. Also, runners with achilles tendinopathy or medial shin pain syndrome have a significantly greater rearfoot eversion during running. This systematic review would allow us to identify a biomechanical relation between the running related myofascial injuries of the lower limb in regular runners, this opens door to another way for myofascial injury examination in sports considering running biomechanics analysis systems, which can identify easily movement disorder patterns that could cause injuries or could help prevent them.

Abstract #4

Short-Term and Long-Term Effects of Kinesiotaping Over Pain and Lumbar Flexibility in Artistic Gymnastics Gymnasts Suffering From Chronic Non-Specific Mechanical Low Back Pain

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Context: The goal of this study is to determine the short-term and long-term effects of applying kinesiotaping (KT) in lumbar erector spinae muscle over pain and lumbar flexibility in female artistic gymnastics gymnasts suffering from chronic non-specific mechanical low back pain.

Methods: 12 female subjects (15.83 ± 2.82 years old), belonging to Club Gimnasia Artística Pozuelo, that practice artistic gymnastics 18 hours a week and present chronic non-specific mechanical low back pain were assigned randomly into two groups: an experimental group (16.6 \pm 2.33 years old) whose members were applied KT "Y" strip (the base was applied over the sacroiliac joint region and the two tails were applied over the muscle with light tension while it was in flexion and rotation to the opposite side), and a placebo group (15.0 \pm 3.22 years old) who were applied similar bandaging without any tension (KT "I" strip 15 cm long applied horizontally over L2 while the lumbar region was in neutral joint position). The following values were measured before the intervention, 30 minutes after the intervention (short-term effects) and 5 days after the intervention (long-term effects): low back pain measured through Pressure Pain Threshold (PPT) with a digital algometer in the spinous process of the fifth lumbar vertebra and through the Visual Analogue Scale (VAS), and low back flexibility using Schöber's Test (ST).

Results: In the intergroup analysis (Mann Whitney U-test) no statistically significant differences were found between the placebo and KT conditions for any of the variables (p>0.05). In the

intragroup analysis (Wilcoxon test) of the experimental group there was a statistically significant reduction in the pain average measured through PPT both in the short-term (p=0.046) and the long-term (p=0.046) measurements, and a statistically significant increase of flexibility in the long-term measurements (p=0.039). In the placebo group analysis, there was a statistically significant decrease of short-term pain only when measured through PPT (p=0.027).

Conclusions: The application of KT in lumbar erector spinae muscle does not have any short-term or long-term effects over low back pain and flexibility in female artistic gymnastics gymnasts suffering from chronic non-specific mechanical low back pain. Further investigation is needed to evaluate in which situations the utilization of KT is convenient.

Abstract #5

Injuries Incidence of Paralympic Athletes in the Preparation Year of the Rio Paralympics Games 2016

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Introduction: The injury epidemiology of Paralympic athletes often receives little attention. The growing interest in sport for people with disabilities in Spain has led to improve of the conditions of the athletes who are preparing to compete in the Paralympic Games. Being high-performance athletes, there is a real interest in their performance and safety, in order to improve their performance and to establish future injury prevention strategies. The objective of the study was to determine the incidence of injuries in Spanish athletes with disabilities during the year of preparation for the Rio 2016 Paralympic Games.

Methodology: A descriptive observational design was defined, with a retrospective and quantitative methodology. Information on the injuries was obtained through a questionnaire, based on the injury collection system of the International Olympic Committee. Initially, it contacted with 127 athletes.

Results: A total of 87 injuries were recorded. 74.7% of athletes were injured during the season; 51 male athletes and 14 female athletes. The sport with the most injuries registered was swimming (21.5%) and athletics (21.5%). The lesion with the most incidence was muscle rupture / strain / tear / cramps (35.4%). The location of the lesion occurred more frequently in the shoulder (26.2%). During the training there were more injuries than during the competition (81.5%). The injuries caused between 1 and 15 days of lost training in the majority of athletes (70.7%). About the athletes injured, 39.1% suffered a relapse.

Conclusions: This is the first epidemiological study to collect lesions in Spanish Paralympic athletes. The type of injuries changes according to the sport. Muscle injuries are the most common. The knowledge acquired in this study will serve as a basis for future studies of injury surveillance and for the development of prevention strategies in Paralympic sport.

Abstract #6

Myofascial Trigger Points and Podylas Laser Treatment

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Introduction: Myofascial trigger points (MTPs) cause painful episodes at some time in patients' lives. This pain can appear in the lower limbs, very frequently on the sole of the patient's foot, and may be confused with fascitis. They are usually responsible for persistent, treatment-resistant talalgias too when this pain mechanism is overlooked. Myofascial trigger points are highly irritable pain points in a nodule within a palpable band of the skeletal muscle. They were described by Travell and Simons in 1942. They created an MTP map of each muscle and the reported pain pattern. MTPs of the abdominal musculature present a set of special characteristics;

the pain pattern is not so constant, and they often cause pain in the lower limbs. MTPs are mainly divided into the categories of active and latent. There are many causes of the activation of an MTP, although it often stems from muscular fatigue and visceral dysfunction. A new, painless and highly efficacious one-session treatment is the use of the 1064nm Podylas laser

Methods: We have treated 324 patients (n=324) with 1064nm low level laser therapy with a six-month follow-up, releasing MTPs that caused pain in the lower limbs. 106 of these patients (n=106) presented MTP in the abdominal musculature that caused reported pain in the lower limbs. This is a highly efficient treatment that significantly improves patients' quality of life.

Results: In 70% of the patients it was necessary a single application of the laser to unlock their MTPs. The 22% needed dis or three sessions and the 8% did not last the relief.

Conclusions: This is a highly efficient treatment that significantly improves patients' quality of life.

Abstract #7

Instrumental Measurement of Muscle Tone in Pubalgia Treated by Fascial Manipulation. A Case Report

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Background: Muscle imbalance is an important issue in numerous sports injuries, and reliable measurement is possible using instruments witch are little known today. On the other hand, groin injuries as well as their symptoms and frequent recurrence, are one of the main causes of withdrawal of the playing fields during a prolonged time. This is a problem for the sports field, the club, and the player himself. It is intended to carry out a myofascial treatment on a 27-year-old footballer, currently playing for the Andalusian soccer federation, who refers pain in the left adductor area, to assess its effect on muscle tone. The symptoms begun in December 2016 and came to treatment after 3 months of evolution, period during which the athlete has not been able to play the matches or scheduled training sessions.

Differential Diagnosis: The player was examined using ultrasound imaging to corroborate the diagnosis. In addition, several functional tests of the hip and surrounding tissues were performed, both pre-treatment and at the end of the 4 treatment sessions: Thomas test, hip range of motion, contraction against resistance to test pain provocation, cross-legged as a provocative test, and painful sporting activities (hitting a ball).

Treatment: The fascial manipulation[©] described by Luigi Stecco was performed at three points consistent with the pathology of the subject: Antemedial-thigh fusion center, Intracoxa myofascial intrarectation sequence, and mesocoxa myofascial mesomotion sequence. The MyotonPro measurement device was used before and after treatment to obtain objective data on changes in soft tissue plasticity that may occur after fascial treatment. Treatment was performed once a week, for 4 weeks.

Uniqueness: The ecography revealed a fibrotic injury of the adductor longus. During the evaluation using MyotonPro technology, the parameters of tone (Hz; F), stiffness (N / m; S) and elasticity (logarithmic decrement; D) were taken into account. The measurements were made on 2 points with reference to the insertion of the adductor longus in the pubis: the first one, 4cm away from the pubis, following a straight line towards the patella (gracilis muscle); the second one, 4 cm away from the mentioned point following a perpendicular with the anterior line (long adductor muscle). After treatment, the values were F = 15.9 Hz; S = 263 N / m; D = 0.81, at values of: F = 15.3 Hz; S = 232 N / m; D = 0.78. Likewise, an increase in the range of motion of the left hip was observed, with a more significant gain in (pre-treatment / post-treatment): Thomas test (positive / negative), abduction (32° / 40^{\circ}), extension (10° / 16°), and progressive decrease of the painful sensation while performing

the functional tests, where the VAS scale was reduced on average from 7 to 2 (0 = no pain, 10 = maximum pain).

Conclusions: According to this case study, fascial manipulation seems to allow rebalancing the tone of the musculature involved in the tendinopathy of the adductor muscles in the athlete, and might contribute to accelerate recovery and "Return to play". On the other hand, the instrumental measurement of muscle tone by means of the MyotonPro has been easy, fast and useful to evaluate this football player, so it could be applied in the field of sports. However, more research with a higher sample size is needed.

Abstract #8

Is Dry Needling Effective to Improve Jumping Capacity and Reduce Pain Post Effort in Basketball Players? A Pilot Study

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Introduction: Dry needling is a physiotherapy technique that consists in introducing a needle in a muscle trigger point to reduce myofascial pain. Propioceptive Neuromuscular Facilitation (PNF) is a type of stretching in which patient activate agonist muscular to increase range of stretching. The objective of the present study is to compare the utilization of dry needling and PNF to improve vertical jump and reduce delayed onset muscle soreness (DOMS) in a basketball team.

Methods: Random case pilot study, simple blinded with two crossed control groups. An amateur basketball masculine team was studied between September 2016 and May 2017, period which corresponds to their regular league. Subjects were divided randomly in two groups. Both groups received both interventions. Group 1 received dry needling, PNF and cryotherapy while group 2 just received PNF and cryotherapy. Afterwards interventions were crossed. In each intervention 3 measures were done for vertical jump with the application MyJump2: one was pre-intervention and two post-intervention (30 minutes after the application of the technique and 48 hours later. For pain after training the Visual Analogue Scale (VAS) was used: pre-intervention training and post-intervention training after 48 hours.

Results: There has been a significative rise in two feet vertical jump (p<0.05) and a not significative rise in one feet vertical jump (p>0.05) after 48 hours in those patients treated with dry needling, PNF and cryotherapy. There is no significative difference in DOMS between both groups.

Conclusions: The utilization of dry needling with PNF and cryotherapy seems to improve vertical jump capacity in basketball players, without clear effect on DOMS.

Abstract #9

The Gluteus Medius and Ankle Dorsal Flexion Influence in the Knee Valgus by the Single Leg Squat Test

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Introduction: The valgus position of the knee in weight bearing exercises can lead to anterior cruciate ligament injury and the patelofemoral syndrome. In football, these injuries are commonly non- contact in nature. Gluteus medium weakness along with a limitation of ankle dorsiflexion can easily cause a valgus position of the knee. The Single Leg Squat is a test used to identify incorrect patterns movements in the lower extremity and is useful to get information about risk injuries factors, related with muscle imbalances, increasing the knee valgus in weight bearing during the test. The aim of this study was to examine if there is connected the

dynamic valgus of the knee and the gluteus medium weakness, in addition to analyse whether the ankle dorsal flexion diminution is connected with a knee dynamic valgus increase.

Methods: Descriptive study, observational and quantitative transverse methods. 54 soccer players were analyzed, all of them men, the average was 18.65 ± 4.29 years old. The degrees of the valgus were analyzed by Kinovea 0.8.15 software. Final valgus, dynamic valgus, ankle dorsal flexion and strength on their gluteus medium were evaluated by IBM SPSS statistics software 22.0.0.0 and dynamometry by MicroFET3 of their right and left knee. Those data that fulfilled the normality were analyzed with the T Student test.

Results: The left-footed individuals present a bigger angle on their left leg final valgus (177.38 \pm 1.8) than the right-footed (171.08 \pm 7.44, p<0.001). However, the left leg dynamic valgus is significantly lower in left-footed people (1.76± 3.41) than in rightfooted ones (6.14 \pm 6.20), where p<0.005. The right-footed individuals present a heavier strength on their gluteus medium, right leg, just like a bigger dynamic valgus in their right leg (p<0.005) being that leg the dominant side. From his non dominant side, we can appreciate a bigger length of trochanter thigh on his left (p=0.011) and a bigger final valgus angle of his left knee, where (p=0.011). The left-handed ones present a bigger initial valgus in their right leg (180.44 \pm 2.24) and final valgus in their right leg (174.37 \pm 5.40), just like final valgus in their left leg (174.37±5.40), than the right-handed who presents lower initial valgus value in their right leg (176.15 ± 3.47) , final valgus in their right leg (167.12 ± 7.63) and final valgus in their left leg (171.00±7.57). It has not been found significant differences (p>0.005) for ankle dorsal flexion values on the single leg squat test.

Conclusions: During the study case, it's been appreciated that the left-footed players and right-footed players present a bigger dynamic valgus in their right leg. On the other hand, the left leg final valgus is bigger in the right knee as much in left-footed players as in right-footed ones. The right-footed players present bigger gluteus medium musculature in their right leg, where we can relate than is bigger the final valgus in left-footed than in right-footed ones, having as a possible consequence the gluteus medium strength diminution that increase the knee valgus.

Abstract #10

Differences in Cycle Length and Time Spent on Foot Leaning While Running in Female Runners With and Without Iliotibial Band Friction Syndrome

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Introduction: The practice of athletics carries risks of injury that can reach up to 79.3%. In runners, the case of injuries that affect the knee can be up to 55%. Among all possible knee injuries in runners, iliotibial band friction syndrome (SFBI) is the second most common cause of pain in runners, its prevalence involve rates ranging from 5% to 14%. The pain at the place of injury occurs when the friction of the band on the bony prominence causes an inflammatory response in the iliotibial band periosteum of the underlying bone or bursa which is located between the bony prominence and fascia. Women are twice as likely to develop this disease as men. Some studies report rates ranging from 16% to 50%.

Study Aims: The objective of our study was to compare the biomechanical variables related to the running cycle - length of cycle and time spent on foot leaning while running in non-professional runners, who at the time of the study currently had, or previously had SFBI, in comparison with healthy non-professional participants.

Methods: Data from 17 non-professional runners were collected, 12 of which are healthy and 5 with the illiotibial band friction syndrome. For each of the runners, a three-dimensional kinematic analysis with infrared camera Vicon[®] system was performed, recorded at a frequency of 120 Hz. For this analysis of the

technique of running, it was recorded once every runner in which they ran between 15 and 20 minutes. The comparison of the data between the two groups was performed using a Student's T of independent averages, the comparison was also performed using repeated measures to find out the existence of significant differences between both legs of each subject.

Results: The normalised cycle length was significantly longer in the SFBI group (1.39 vs 1.14, p = 0.01), and the time spent on foot leaning was shorter in SFBI runners (35.16 vs 39.53, p = 0.03).

Conclusions: The results support our hypothesis in showing that there are significant differences in the kinematics of the race technique between healthy runners and runners with iliotibial band friction syndrome (SFBI). With regard to the cycle variables, the standardised cycle length seems to be a determinant of the risk of injury to the iliotibial band, becoming greater in the runners who suffer from it. Furthermore, the shorter foot leaning time found in the injured runners demonstrates the existence of greater loads in the knee, and therefore, an increased risk of injury.

Abstract #11

Haemophilia: Exercise, Sport and Physiotherapy

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Background: Bleeds are recognized as no longer being a cause of death for individuals with haemophilia, but the accompanying musculoskeletal injuries now represent the main problem associated with this disorder. Sports, Physical exercise and Physiotherapy is one of the basic foundations in the treatment of haemophilia.

Objectives: The aim of this study is to offer a synthesis the importance of the physical condition, about prevention and treatment of musculoskeletal lesions in the hemophilic patient, according to the scientific literature.

Methods: Keyword searches of PubMed, Scopus, ScienceDirect, Cochrane and PEDro databases.

Results: The practice of sports and Physiotherapy, both improve the psychosocial, physical and medical status of patients with haemophilia. Appropriate exercise that is adapted to the special needs of everyone has a positive effect on quality of life. Exercise programs for people with haemophilia are generally designed and implemented with the aim of helping to deal with recovery after haemarthrosis or muscle hemorrhage, or as a tool for preventing bleeding episodes. The selection of an appropriate sport that can reduce the risk of injuries as much as possible is important. This must be in line with the ability of each patient and the person's specific needs. Children with haemophilia can have functional deficits related with the illness and frequently exhibit subclinical findings in the joints; therefore, an exam, aptitude assessment and orthopedic movement analysis can help guide the preventive physiotherapy and choice of sport. Although swimming and exercises in water are the most recommended sports and those that appear to have a positive effect on the physical status of patients with haemophilia, others such as therapeutic climbing, have demonstrated their effectiveness in young adults with severe haemophilia. It is important to consider that in patients with haemophilia, their level of physical condition, muscle strength, aerobic resistance, anaerobic resistance and proprioception are all decreased. Muscle atrophy and instability make the joints more vulnerable to the demands that are placed on them and this increases the risk of injury and the establishment of a vicious cycle that is difficult to break, characterized by pain, immobility, atrophy, joint instability and repeated bleeding episodes. Thus, regular physical activity is recommended as a complement to conventional treatment, with positive results for the prevention of joint problems

and bleeding. Furthermore, exercise improves cardiovascular function, muscle strength and body composition. Training with resistance loading and over appropriate lengths of time, considering the severity of the illness and accompanied by physical education professionals, improves muscle strength, balance and proprioception. Also, aerobic training reduces the risks of obesity and cardiovascular and metabolic disease.

Conclusions: In the management of the patient with haemophilia, controlled by clotting factor replacement therapy, there is a generalized consensus on the need to include exercise and sports programs and physiotherapy.

Abstract #12

Effectiveness of Dry Needling Combined With Kinesio Taping on Pain and Disability in Athletic Subjects With Myofascial Pain Syndrome: A Prospective Randomized Clinical Trial

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Objectives: 1) To determine the effectiveness of dry needling (DN) combined with kinesio taping (KT) on pain and both neck and shoulder disability caused by myofascial trigger point (MTP1) in the upper trapezius. 2) To investigate the effectiveness of KT application in reducing post-needling soreness (PNS). 3) To establish whether the number of LTR (Local Twitch Response) is proportional to PNS' intensity and duration.

Methods: Athletic subjects were 34 males and females (19 males, 15 females), aged 20 to 40 years. They were randomly divided into 2 groups: a control group, that received DN only, and an experimental group, which received both DN and KT. Both techniques were applied to the upper trapezius muscle on MTP1. All subjects were evaluated according to pain, PPT (Pressure Pain Threshold) and disability. Pain intensity was assessed by using a NRS (Numerical Rating Scale for pain) and PPT was measured by using an algometer. Subjective pain response (PNS) and subjects' own ratings of perceived disability were measured. Disability and PNS were assessed with Neck Disability Index (NDI) and Shoulder Pain And Disability Index (SPADI). Algometric measurements were taken before and immediately after the treatment, as well as 72h after the treatment. On the other hand, the NRS, NDI, and SPADI measurements were taken before and immediately after the treatment, as well as 24h, 48h and 72h after treatment.

Results: Results were not statistically significant. PPT decreased in both groups immediately after treatment and increased 72h after treatment. However, the PPT in the control group improved more (p = 0.126). Results from NRS (p = 0.484), NDI (p = 0.202) and SPADI (p = 0.968), showed that both PNS and pain decreased more in the experimental group. It wasn't found a good correlation between LTR's number and NRS immediately after treatment (p = 0.16), 24h (p = 0.947), 48h (p = 0.427) and 72h after treatment (p = 0.13). In the same way, it wasn't found a good correlation between LTR's number and algometric measurements immediately after treatment (p = 0.396) and 72h after treatment (p = 0.354).

Conclusions: both DN and DN combined with KT improve pain, PPT and disability. DN combined with KT does not seem to be more effective then DN only. KT does not appear to be effective in reliving PNS, besides measurements from self-reported questionnaires of the experimental group showed improvements clinically more significant. No direct correlation between LTR's number and PNS' intensity and duration was found.

Abstract #13

Injury Incidence in Disabled Swimmers During the 2015/2016 Season

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Context: Swimming is a sport that can be performed by most people with and without disabilities. It is the second most practiced sport in Spain, with 38.5% of participants, behind the cycling, with a 38.7%. Each disabled swimmer must make certain adaptations according to their needs, which can lead to certain injuries, besides like any high-performance sport, involves high demands on the athlete in terms of time and training load; these levels of stress generate a lot of stress on the joints and muscles of the athlete, so they can also generate certain injuries. Faced with this, it is necessary to know the most frequent injuries in both conventional and adapted swimming in order to try to reduce them.

Purpose: To know the incidence of injuries in high competition disabled swimmers during the season 2015/2016 of all styles. Other secondary objectives were, to determine the incidence of injuries in disabled swimmers depending on the type, cause, reason and injured part; according to his disability, swimming style and the moment of injury; and to know the type of treatment, clinic and financing of disabled swimmers when injured.

Research Design: A descriptive, observational, retrospective and quantitative methodology was designed. 56 disabled swimmers with a minimum level of national competition filled out a questionnaire about their sports injuries during the 2015/2016 season. The variables that were measured were: age, swimming style, type of disability, maximum level of competition, number of training and daily hours; Number of lessons in the last season and days of low competition and training; Body part injured and type of injury; The cause of the injury, the type of treatment received, the number of sessions, the type of clinic and the financing of the treatment.

Results: 78.6% (n = 44) of disabled swimmers suffered any type of injury. The most frequent type of injury was muscle rupture/ tear/ strain with 45.5% (n = 20); the most frequent injured part was the shoulder/ clavicle with 38.6% (n = 17); and the most frequent cause of injury was non-traumatic contact with 50% (n = 22). 81.8% (n = 36) suffered any type of injury by overload. The physically disabled with 47.7% (n = 21) were those who suffered more injuries and the swimming style with the highest number of injuries was crawl with 40.9% (n = 18); and the time of injury occurred during training in 75% (n = 33). 97.7% (n = 43) of the injured subjects received treatment, being the most frequent the physiotherapist with 74.4% (n = 32). The type of clinic more used by the subjects was private with 89.2% (n = 33) and the most used financing was the subject itself with 54.1% (n = 20).

Main Findings: The most frequent injury in disabled swimmers is muscle rupture/ tear/ strain produced by a non-traumatic contact, and in the shoulder/ clavicle. The reason and the main place of the beginning of the injuries was the overload during the trainings. It was the physically disabled and the crawl swimmers who suffered the most injuries. The treatment most used by the subjects of the study was the physiotherapeutic, in private clinic and financed by the subject itself.

Abstract #14

Biomedical Versus Biopsychosocial Treatment Orientation of Athletic Trainers and Athletic Therapists in North America Regarding Low Back Pain

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Context: Low back pain continues to be a medical, economic and social burden due to high rates of recurrence and chronicity. Previous research on the treatment of low back pain has focused on the management of biopsychosocial beliefs of the patient, which have been identified as barriers to their rehabilitation. A multimodal approach including addressing biopsychosocial factors is recommended for the treatment of low back pain. Recent evidence now suggests that the clinician's beliefs and attitudes towards biopsychosocial principles can influence treatment strategies and outcomes for their patients. While certified Athletic Trainers and Athletic Therapists treat patients with low back pain, no data exists on their biomedical versus biopsychosocial orientation. The purpose of this study was to characterize American Athletic Trainers and Canadian Athletic Therapists low back pain treatment orientation as biomedical or biopsychosocial.

Methods: Approximately 4500 Athletic Trainers and Athletic Therapists received an invitation to complete an online survey consisting of the Pain Attitudes and Beliefs Scale for Athletic Trainers/Therapists, and demographic questions including; sex, age, years of experience, job setting, client type, average number of back pain patients treated per year, personal experience of low back pain, post-professional training, and specialization.

Findings/Results: Four hundred and seventy three Athletic Trainers completed the survey. There were 120 male and 152 female Athletic Trainers whose ages ranged from 22 to 75. Most ATC's had a Master's level of education (70%), worked with high school athletes (44%), and worked in private clinics (32%) and secondary schools (30%). Athletic Trainer's mean biomedical score (33.2±6.6) was significantly higher than the mean biopsychosocial score (29.8±4.4, p>.001). In addition, Athletic Trainers who treated less than 15 low back pain patients per year had a significantly higher biomedical score (35.0±5.7) than Athletic Trainers who treated more than 15 (31.9±5.5, *p*=.039), and 34 (31.7±8.6, p=.018) low back pain patients per year. Of 399 Athletic Therapists who completed the survey, there were 137 males and 262 females whose ages ranged from 21 to 69. Similar to Athletic Trainers, Athletic Therapist's mean biomedical score (32.2±6.5) was significantly higher than the mean biopsychosocial score (31.3±4.2, p=.030). However, Athletic Trainers had a significantly higher biomedical score compared to Athletic Therapists (p=.037). As well, Athletic Therapists who treated a higher number of low back pain patients had a significantly lower biomedical score (31.4±6.8) than those who treated a lower number (34.7 \pm 6.9, p=.005). Dissimilar to Athletic Trainers, Athletic Therapists who primarily treat the general public had significantly higher (31.7±4.1, p=.040) biopsychosocial scores than those therapists treating athletes (30.1 \pm 4.1), and Athletic Therapists who had less experience had significantly higher biomedical scores (34.4±5.2, *p*=.001).

Conclusions: While a biopsychosocial approach to low back pain treatment is recommended, these findings suggest Athletic Therapists/Trainers retain biomedical practices. A previous study showed patients treated by physiotherapists having a higher biomedical score reported poorer treatment outcomes. Further, previous studies indicated that Dutch and Swedish physiotherapists with a higher biomedical orientation advised against current low back pain treatment guidelines. This is a concern as our Athletic Trainers and Athletic Therapists reported higher biomedical scores as compared to the aforementioned studies. This suggests that there may be an even greater disparity from the treatment guidelines in Athletic Trainers and Athletic Therapists in North America resulting in poor treatment outcomes for patients and athletes. Further research needs to focus on the impact of Athletic Trainer's and Athletic Therapist's biomedical orientation on rehabilitation strategies and outcomes.

Abstract #15

Observational Study of Flexor Pulley System, Finger Flexor Tendon Thickness and Time to Recovery in Rock Climbers

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Introduction: A2 and A4 pulley ruptures are the most prevalent rock climbing related injuries and it is considered that ultrasound is the diagnostic gold standard tool due to the dynamic evaluation. The purpose of this study was to determine the factors that may modify tendon-bone distance for the A2 and A4 pulleys, thickness of the finger flexor tendon and time to recovery from pulley pathology.

Methods: An observational study was conducted in a rehabilitation clinic. In 204 in vivo fingers of 102 climbers, 408 poles (half of these A2 and the other half A4) were analysed via ultrasound with 21 MHz, considered the ideal frequency for visualizing pulleys. The non-ultrasonographic variables analysed through questionnaires were: height, weight, age, climbing level (using the international climbing difficulty metric scale), number of years climbing, and number of years climbing in high level (over a 9.33 of difficulty), hand, finger and thenar length and time to recover. The ultrasonopraphic variables analysed by the Toshiba aplio i800 ultrasonography were: proximal and medial phalanx length, thickness of the fingers flexor tendon and the bone-tendon distance for A2 and A4 pulleys. For statistical analysis, Pearson's correlation coefficient was performed to examine the relationships among all these variables with tendon-bone distance for pulleys, flexor tendon thickness and time to recovery.

Results: Regarding the pulleys, there was a weak association between the corresponding A2 and A4 pulleys tendon-bone distance of the same finger (r=0.281, p=0.004), which justifies the alteration of one pole as a result of its neighbor pole rupture. Moreover, performance level (r=0.332, p=0.001) and number of vears climbing (r=0.334, p=0.001) cause an adaptation that ended in increased bone-tendon distance of both pulleys in both axis. With reference to flexor tendon thickness, higher performance level (r=0.272, p=0.006) along with number of years climbing (r=0.396, p < 0.001) and number of years climbing over 9.33 of difficulty (r=0.378, p < 0.001), showed quite strong and significant association with both depth and width of the tendon. Surprisingly unlike the depth, the width of the tendon is coordinated with all kind of lengths such as finger, hand and phalanx length. In terms of the rehabilitation time period, the patients with increased bone-tendon distance (r=0.387, p=0.013) as well as the ones who have been climbing for many years beyond 9.33 of difficulty (r=0.406, p=0.008) are more likely to need a longer time to recovery. On the contrary, against our hypothesis, the age is not correlated with time to recovery.

Conclusions: In conclusion, it is important to recognize current patterns, which cause tissue adaptations, as in the case of flexor tendon thickness growth or tendon-bone distance increase, not to slide into a failed diagnosis. Further research is needed to examine which ultrasound measurements are adaptations or relevant pathologic information, as each climber is different.

Abstract #16

Effects of the Myofascial Induction Technique at Fascia Thoracolumbar on Lumbopelvic Stability in Patients With Nonspecific Low Back Pain

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Introduction: The low back pain is a musculoskeletal syndrome that is characterised by the appearance of pain in the lower back region. It is considered as a major public health issue associated to enormous socioeconomic costs. The thoracolumbar fascia is a structure of connective tissue that is in the lower back. formed by the aponeurosis of different muscles and which has an important role on the lumbopelvic stability and transmission of strength. Due to the great number of sensitive receptors, it is of vital importance in lumbar pain being a great source of nociceptives imputs. Among people with lower back pain, there is a disorganization of the TFL collagen and dehydration of the extracellular matrix, increasing stiffness and decreasing the slippage between fascial layers. The abdomen transverse is continued with the thoracolumbar fascia through the lateral rafe, and through its contraction, it tenses the TFL to generate stability. The purpose of this study is to demonstrate the effectiveness of myofascial induction in the thoracolumbar fascia in improving lumbopelvic stability and pain reduction in patients with non-specific lower back pain.

Methods: 20 male patients between 25 and 50 years of age with non-specific lower back pain were chosen at the Fisiosport clinic in Madrid following the criteria of the visual analogue pain scale. The VAS was an inclusion criterion, reviewed at the beginning of the study and two tests were applied with the biofeedback unit pressure meter. In the first one, the transverse abdominal activation was measured in the prone position using the Draw In (DI) manoeuvre and in the second, the stability in the sagittal plane with the Single Leg Straight Raise (SLSR) test. 10 patients were applied a myofascial direct induction technique following the principles of contact, loading and release for 5 minutes per technique in the lateral rafters of the thoracolumbar fascia, spinal fascia and bilaterally in the anterior CTL through the iliac fascia once per week for two weeks. The control group was subjected to a placebo technique consisting of 5 superficial neurocutaneous passages in medial to lateral application with the same frequency. At the end of the study, all parameters were tested again.

Results: Significant differences were found improving the data in all the tests throughout the intervention group. In the EVA, there was a substantial drop in pain GE (n=10) 1.300±0.667, significance=2.110 (asymptotic and bilateral), p<0.001; In the DI test, there was an improvement in the activation of the abdominal transverse 21.970±2.152, significance=6.808 (asymptotic and bilateral), p<0.001, the motor control also improved in the SLSR test D 55.731±3.295, significance=10.419 (asymptotic and bilateral), p=0.005, as well as in the SLSR test I 53.596±3.179, significance=10.054 (asymptotic and bilateral), p=0,004. As opposed to the control group (n=10) where there were no significant changes in any of the tests, EVA 5.600±0.476, significance=1.505 (asymptotic and bilateral), p=0.104, DI 30.431±1546, significance=4.890 (asymptotic and bilateral), p=0.144, SLSR D 63.498±2,657, significance=8.402 (asymptotic and bilateral), p=0.225, SLSR I 65.363±1920, significance=6.073 (asymptotic and bilateral), p=0.348.

Conclusions: Direct, deep and sustained myofascial induction techniques seem to be effective in reducing pain in patients with lower back pain. The results indicate that there is a more efficient transverse movement of the abdomen in the Draw In manoeuvre and that in the Single Leg Straight Raise, the level of lumbopelvic stability increases. The induction in the lateral rafe helps the sliding of the transverse of the abdomen and produces a more efficient activation generating an extensor moment at transverse level. According to this study, motor control improves in short term, so it seems an ideal technique to apply at the beginning of a treatment protocol in patients with lower back pain, reducing pain and then continuing with a program of motor control.

Abstract #17

To Compare Post-Concussion Test in Adult Rugby Players in Spain First Division

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Introduction: Rugby is a sport contact. For such characteristics, there is a great number of injuries. One of the most important and frequent injuries is concussion. Concussion is considered as a like a traumatic physiological disruption of brain function. This can be associated with a loss or alteration of consciousness. It goes up to 25% of all sport injuries. Concussion can occur in a direct way (hit in head) of indirectly (a skull acceleration and deceleration). For its diagnostic and after evaluation Sport Concussion Assessment Tool 3 (SCAT3) is used. In addition, in American Football King Devick test (KD Test) is used. The present study tries to compare both concussion test in rugby players who have suffered a concussion. To evaluate if there are differences between KD test and the

equilibrium items of SCAT3 test. To do so international approved tests have been used.

Methods: Observational, descriptive and transversal study. Participants are adult rugby players who have not suffered more than two concussion in this last year. We have evaluated diagnostic test and controlled concussion injuries recommended by World Rugby, getting items related with balance, concentration and symptoms scale. KD test has also been used to evaluate saccadic eye movement.

Results: In a sample (n=66) where 100% of participants were male, with an average age of 23.66 (\pm 4.2) years old a 56.1% of players has suffered at least one diagnosed concussion. In concentration test, there is an average of 3.56 (\pm 1.05) over a total 5 point observed. In balance test, we observe that the average time is of 12.334(\pm 2.61) seconds. KD test shows an average of 40.476(\pm 6.68) seconds. Finally results in symptoms scale PCSS has an average of 14.11(\pm 16.22). After comparing balance test, KD test, PCSS and concentration we find statistically relevant results for our study between players who have suffered concussion and players who have not in short term memory (p=0.031) and KD test near to significance with a p value of 0.073.

Conclusions: We found that there is a significate difference in our tests if we compare concussed players and according to their position. After the analysis, we conclude it is important to realize all the different tests to determine if the player has suffered a concussion. It is important to keep on studying about these tests and the difference that there may be between them.

Abstract #18

Effects of Neuromuscular Technique on the Temporal Muscle Versus Jones Technique on the External Pterigoid Muscle in Athletes Suffering From Temporomandibular Dysfunction

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Introduction: Temporomandibular dysfunction (TMD) is defined as a set of signs and symptoms, including alterations of the joint itself, masticatory muscles and occlusion. Facial traumatism in sports is associated with temporomandibular disorders. Due to the intensity and duration of training required for elite level competitions, athletes may have from two to five times more traumatic injuries than recreational athletes. There is also a direct relationship between the alteration of the plantar footprint and temporomandibular dysfunction during sports practice.

Objectives: To evaluate the influence of the neuromuscular technique (TNM) at the temporal musculature level in comparison with Jones technique applied to the external pterygoid muscle in athletes, short distance runners with TMD, and to observe if there is any modifications of those elements which will be measured.

Material and Methods: A randomized clinical essay was carried out with 15 athletes, Control Group (CG: n=5), Experimental Group 1 (EG 1: n=5) and Experimental Group 2 (EG 2: n=5). In EG 1 TNM was applied on temporal muscles In EG 2 Jones' technique on external pterygoid muscles was applied; , and CG received a placebo which consisted on the simulation of a myofascial induction technique at the level of temporal musculature using the same time spent on experimental groups.

Results: Differences statistically meaningful (p<0.05) for right and left masseter muscle and for temporal left muscle were found in the intergroup analysis. In the paired group analysis, statistically significant data were obtained between G1 and G2 for the left masseter, and between G2 and G3 for right and left masseter and, right and left temporal masseter muscles. In the intragroup analysis, statistically significant differences were found in the G2 for left masseter and left hand duct.

Conclusions: The TNM on temporal muscle and Jones' technique on external pterygoid muscle produce an increase on

pain threshold to the pressure of trigger points of masseter and temporal muscles. Jones' technique produce an increase on the mobility of temporomandibular articulation.

Abstract #19

Musculotendinous Stiffness and Passive Muscle Properties of the Hamstrings After a Single-Session Treatment Using Instrument Assisted Soft Tissue Mobilization (IASTM)

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Context: Hamstring injuries are common among athletes and are problematic due to lengthy recovery times and increased risk for reoccurrence. A common risk factor for hamstring injury is inadequate extensibility within the posterior thigh compartment. Flexibility may be hindered for a number of reasons, one of which is fascial restrictions. Fascia can become restricted due to injury, inactivity, or inflammation, and can lead to decreased flexibility and increased pain. Passive musculotendinous stiffness (MTS) is a measure of the mechanical properties of the muscle-tendon unit and can be calculated using the angle-torque curves recorded during a passive stretch. Relatively high stiffness in humans has been related to increased risk soft-tissue injuries such as hamstring strains. Various techniques of myofascial release are used to alleviate the effects of fascial restrictions, with the purpose of manipulating the fascia to facilitate histological length changes to relieve fascial restriction symptoms such as pain and restricted range of motion (ROM). The goals of such treatments are to decrease muscle tension and stiffness, decrease muscle pain, swelling and spasm and increase joint flexibility and motion. As fascia is manipulated it becomes more fluid and less viscous, therefore, techniques of myofascial manipulation are able to address muscular involvement and the thixotropic nature of fascia to return it to a softer and more pliable state. Instrument Assisted Soft Tissue Mobilization (IASTM) is a common method used to augment the soft tissues and has been found to increase ROM and decrease pain in myofascial injury. This globally used technique has received much recent attention, but the explanation of its physiological effects is not well documented. Since athletes strive to remain injury free and to perform optimally, and stiffness is recommended as an important screening marker for physiotherapists, athletic trainers, and other practitioners, studies are needed to evaluate the impact soft tissue augmentation has on the stiffness properties of muscle. Therefore the purpose of this research was to investigate changes in MTS and ROM after one treatment session of IASTM in the hamstrings.

Methods: Twenty-nine, healthy young adults aged 18-25 years were randomly assigned to two groups (IASTM n = 17; Control n =12). The IASTM group received sweeping strokes of 30 per minute distal to proximal, and 30 strokes per minute proximal to distal repeated for 4 minutes, and 15 strokes each direction for one additional minute using the GT-1 instrument [Graston Technique®] on the right leg. The Control received no treatment and remained seated for 5 minutes. Both groups underwent passive, computercontrolled straight leg assessments at a constant stretching velocity using a calibrated Biodex System 4 isokinetic dynamometer to the point of discomfort but not pain. Passive musculotendinous stiffness (MTS), passive torque (PT), and maximum range of motion (ROM) were determined at 4 common joint angles () separated by 5° during the final common 15° of ROM for each participant. Variables were assessed at six time points (pre-intervention, immediately after, 10, 20, 30 minutes post-intervention, and 48 hours post-intervention).

Results: IASTM had no significant effect on MTS (F = 2.049; p = 0.102), PT (F = 0.297; p = 0.628), or ROM (F = 0.204, p = 0.897) compared to the control group. ROM was greater at 30 minutes post-intervention than pre-intervention ($p \le 0.001$), post-intervention

(p \leq 0.001), and 10-minutes post-intervention (p = 0.002), but there was no difference in between group comparisons.

Conclusions: A single treatment of IASTM presented no significant short-term or long-term effects on MTS or flexibility in healthy muscle tissue. However, further studies are needed to determine these effects in injured muscle or in those that lack appropriate hamstring length.

Abstract #20

Knowledge About Return to Play After a Concussion in Spain

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Introduction: Concussion is defined as a brain injury that comes from a direct impact on the head or elsewhere causing a brain whiplash. Nowadays the scientific community is researching on the correct diagnosis of the concussion and especially when it is safe for athletes to return to play. Diagnosis assessment of concussion and the return to play protocols are being developed in different countries. It is wanted to know if in Spain therapists use any return to play protocols in different sports. Soccer in Spain is the most practiced sport and concussion has a high incidence in this sport. Moreover, Rugby is added in this research although the number of practitioners in Spain is small, the incidence of concussion is very high. No other sports were discarded.

Methods: A survey is conducted to different therapists and coaches of several sports in Spain. The questions were structured to reflect the knowledge about concussion and when and how athletes should return to play after a concussion. This survey was sent via email or WhatsApp and once the participation was approved the results were collected automatically via Google Forms. Once collected the data were analyzed qualitatively.

Results: Almost all the participant were physiotherapists (38%), coaches (26.4%) and sport science (20.9%). About where they worked, most of them either in academy (37.4%) either in top first division (28.8%). The majority corresponded to soccer (49.7%) and rugby (37.4%). As for the decision to return to play the athletes, a 16% did it at 48 hours, 13.5% at 72 hours, 33.4% a week and 18.4% at two weeks. 58.4% of the participants referred to authorization by the doctor as a requirement for the return to play. When this question is asked to health professionals, (physicians and physiotherapists) the majority, 72.1% do not use any diagnosis to assess the gradual return to play.

Conclusions: In Spain, health care professionals that are working in sport and staff seems that they have not clear knowledge about when athletes should return to play after a concussion. They do not use the neurocognitive tests in order to decide if athletes are able to return to train/play. As a final conclusion, it is necessary that health care providers should have a plan of training about concussion, neurocognitive tests in order that they were able to decide when an athlete can return to play/train.

Abstract #21

Impact of Intermittent Fasting on Lumbar Discal Herniation and Fascial Tissue in Athletes

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Context: Spinal pathologies in athletes are a limiting factor that slows down the recovery and return to the field, and lumbar is one of the most affected areas. At this level, the lumbar disc herniation is related to chronic pain on low back (affecting 84% of total population). The causes involved in disc herniation are multifactorial, affecting many tissues, including the fascial one, related to a fibrotic process and a deficient cicatrization, developing limits in movement and chronic pain. The insulin resistance is a metabolic

factor to take into account by its impact in increasing the production of pro-fibrotic factors as TGFbeta y PAI-1. There are investigations that shows a possible interaction of glucose and chondrocytes, and the sensitivity of GAG and hyaluronic synthesis, both related to this pathology. Intermittent fasting during night has been described as an option to prevent and decrease the insulin resistance, and it could have a possible influence in health parameters as mithochondrial amount in neurons, mental alertness and insulin sensitivity, besides it may be beneficial for overweight and obesity. The objective of the program is to determine the impact of IF 4 weeks, 14 hours each day, on athletes with lumbar herniated disc, supporting the study on possible benefits of intermittent fasting on fascial tissues associated to this pathology. By including the IF, we prevent insulin resistance and related factors such TGF beta and PAI-1, both involved in damaging connective tissue growth.

Methods: 18 athletes with magnetic resonance diagnosis of lumbar disc herniation, and age of 30 to 50 years old. All subjects met all stablished criteria and were randomly assigned to one of two groups: intervention group (IF 14 to 16 hours of fasting, n=8), and control group (fasting less than 12 hours, n=8). We evaluated all the parameters at the beginning and the last day of the intervention (30 days). Both evaluation results were compared and statistically analyzed. Those data that fulfilled the normality and homoscedasticity were analyzed with the T Student test.

Findings/Results: Intervention group demonstrated a significant improvement on different parameters related to this pathology compared to the control group (there were no significant results). The intervention group (IG) had a significant reduction in analogical visual scale (EVA), body mass index (BMI), abdominal perimeter (AP) and trunk flexibility in Sit & Reach test by using the criteria of "t" of student (p<0.05). In other parameters, following the same method, as the Schöber Test, mental agility and blood pressure there weren't significant results (p>0.05).

Conclusions: IF during 4 weeks, 14 hours per day, compared to the regular eating habits was associated with significant reductions in body mass index, perception of pain, abdominal perimeter and trunk flexibility in men and women athletes with ages from 30 to 50, suggesting a possible benefit of IF on patients with lumbar disc herniation. However, further studies are needed to determine the impact of intermittent fasting on myofascial injuries.

Abstract #22

The Effect of a Four Week Hip Extension Exercise Strengthening Programme on Isokinetic Hamstring Strength in Footballers With and Without a History of Hamstring Strain

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Context: Hamstring strains account for up to 24% of all Gaelic football injuries, with 84% affecting the biceps femoris. They have a recurrence rate of up to 36%¹ which may be contributed to by persistent eccentric weakness following return to play³. Reduced eccentric hamstring strength and suboptimal hamstring to quadriceps strength ratios (H:Q) are proposed risk factors. Despite the implementation of injury prevention programmes, the incidence of hamstring strains continues to grow in soccer and Gaelic football¹. The recently reported 45° hip extension exercise (45° HE), has been found to preferentially strengthen the biceps femoris in a lengthened position and may play a role in hamstring injury prevention programmes, however, its effect on isokinetic strength of the hamstrings is not known.

Methods: Twelve injury-free, male, varsity Gaelic footballers (22.9 ± 2.4 years, 181.2 ± 6.7 cm, 86.1 ± 6.4 kg) volunteered for this study. Six participants reported a history of unilateral hamstring strain 6 to 12 months prior to the study and were matched (by playing level, leg dominance and side of hamstring injury) with a footballer with no history of hamstring strain. Unilateral quadriceps

and hamstrings strength were recorded using a Biodex III isokinetic dynamometry (Biodex Medical Systems, Shirley, NY) pre and post a 4-week 45° HE programme. A repeated measures ANOVA determined the main effects for time (pre *vs* post) and history of hamstring strain (positive *vs* negative) and any interaction effects for hamstring isokinetic peak torque at $60^{\circ}s^{-1}$, functional H:Q (eccentric hamstring to concentric quadriceps at $60^{\circ}s^{-1}$) and mixed H:Q (eccentric hamstring torque at $30^{\circ}s^{-1}$ to concentric quadriceps torque at $240^{\circ}s^{-1}$).

Results: There were interaction effects for peak eccentric hamstring torque at 60° ($F_{2,10}$ = 0.003, p = 0.955, $\eta^2 < 0.001$), functional H:Q ($F_{2,10}$ = 0.695, p= 0.424, η^2 = 0.065) and mixed H:Q ($F_{2,10}$ = 0.251, p= 0.627, η^2 = 0.024). A significant effect for time with a large effect size was noted for peak eccentric hamstring torque at 60° ($F_{2,10}$ = 5.372, p= 0.043, η^2 = 0.349) but not for functional H:Q ($F_{2,10}$ = 0.426, p= 0.525, η^2 = 0.041) or mixed H:Q ($F_{2,10}$ = 0.126, p= 0.730, η^2 = 0.012). Although not statistically significant, history of hamstring strain had a strong effect on mixed H:Q ($F_{2,10}$ = 3.849, p= 0.079, η^2 = 0.277). However, there were no main effects for history of hamstring injury for peak eccentric hamstring torque at 60° ($F_{2,10}$ = 0.385, p= 0.549, η^2 = 0.037) and functional H:Q ($F_{2,10}$ = 0.268, p= 0.616, η^2 = 0.026).

Conclusions: Four weeks of a 45° HE programme resulted in greater eccentric hamstring peak torque at $60^{\circ}s^{-1}$ with strong effect sizes, suggesting that this exercise may have a role in injury prevention programmes. Although not significant, history of hamstring strain has a strong effect on H:Q mixed ratios, indicating a persistent increased risk of hamstring strain the importance of continued hamstring strengthening exercises in those with a positive history of hamstring strain.

Abstract #23

Effectiveness of Analytical Warm-Up of Deep Shoulder Muscles in Rugby Players

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Introduction: The prevalence of the pathology of the shoulder in rugby is of 86.40 injuries per 1000 hours of game. This injury leads to an average of 176 days of sport absence. We have observed that tackles have an influence of the 56.00%. The rotator cuff functional performance, sports level, training system or the fatigue are described as factors influencing the injury. The specific strengthening and improvement of motor control of the deep shoulder musculature is currently used as one of the main objectives of the rehabilitation of shoulder pathology.

Purpose: As a prevention system, we propose evaluate, if a warm-up of the deep musculature could produce changes in isometric maximum strength of the deltoid muscle and reduce the time of the infraspinatus muscle activation between two groups of rugby players randomly distributed.

Methods: We conducted a longitudinal prospective clinical study, with a sample of 12 healthy subjects of 23.58±5.62 years. There is no blinding of researchers only randomization of the subjects into the groups. They were divided in a control group (n=6), who would perform a regular rugby warm-up and an experimental group (n=6), who would perform an analytical warmup of the shoulder deep musculature. Before and after the treatment, we measured the isometric maximum strength of the deltoid muscle at 60° of abduction of the shoulder with the BTE PrimusRS® dynamometer. The dynamometry has a coefficient of variation (COV) which if it finds a difference of more than 10% among the 3 repetitions of the exercise, the patient is excluded from the study. After performing the measurements with the dynamometer and excluding the subjects that did not exceed the coefficient of variation, the groups were distributed as follows: in the control group (n=6) after COV remained 4 subjects (nCOV=4) and in the experimental group (n=6) remained 3 (nCOV=3). Also we measured the time of muscle activation of the infraspinatus muscle measured with a surface electromyography system, Physioplux[®].

Results: All the obtained results were analyzed. We had a sample that did not surpass the coefficient of variation (nCOV=7) but the analysis was undertaken with the 7 resulting cases and the first 12 subjects to compare. In the control group we did not find significant differences (p<0.05) in the analysis of the samples related in the isometric maximum strength of the deltoid, with or without COV filter. In the experimental group we did not find significant differences in the analysis of the samples related in the isometric maximum strength of the deltoid or in the time of muscle activation of the infraspinatus muscle, with or without COV filter. There were no significant differences (p<0.05) in the analysis of independent samples in the isometric maximum strength of the deltoid or in the time of muscle activation of the infraspinatus muscle, with or without COV filter. There was a decrease of the short-term in the control group (p<0.05, p=0.021) of the infraspinatus activation compared to the deltoid muscle, delaying its activation in 24.75 ms (40.90% of the total initial time), whereas in the experimental group the activation was maintained after the intervention. Moreover, with no significant variation, the force in the control group (-5.32 kg) decreased while in the experimental group (+11.80 kg) increased.

Conclusions: A proper warm-up routine would prevent injuries related to rugby. The analytical exercises increases, not being significant (p<0.05), the strength and maintains the infraspinatus activation. The regular rugby warm-up showed a significant decrease of the infraspinatus activation short-term. In this regard, more reliable and specific investigation should be designed including long-term effects.

Abstract #24

Effect of Physical Activity on Propioceptive Postural Stability

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Context: Physical activity has shown numerous physiological benefits on the human organism, however some studies indicate that there is a post-functional deterioration of proprioceptive postural balance as a consequence of fatigue and wear of physiological functions. This decline in proprioceptive activity may have some risk of injuries or accidents during sports practice in situations that require a correct postural stability. Despite this, there are studies that do not identify short-term changes in proprioceptive postural stability, therefore, the decrease of the levels of propioceptive postural stability are recovered in the short term, however, we have not found studies that analyze the changes in the long term. Correct proprioceptive stability requires good control and activation of the trunk muscles. Strengthening of this muscle is intimately related to sports practice and is included in most training programs.

Objectives: Evaluate the effect of maintained physical activity on proprioceptive postural stability. Analyze the differences between study groups on proprioceptive postural stability.

Methods: A descriptive study was carried out on 57 young subjects (N = 57), 22 years (SD: 3 years), 21 men and 36 women. They were divided into three groups according to their level of physical activity, which was assessed using the validated IPAC questionnaire, categorizing them as low, moderate and high level. The subjects could not be medicated, or in period of recovery of musculoskeletal lesion. A stabilometric analysis was performed through a stabilometric platform in three levels of difficulty (easy, intermediate, difficult) taking as dependent variables of study: Overall Balance Index, Overal Balance Index SD, Antero-Posterior

Index, Antero-Posterior Index SD, Medial-Lateral Index y Medial-Lateral Index SD.

Findings/Results: No statistically significant differences were found between the study groups for any of the variables (P > 0.05).

Conclusions: Levels of physical activity do not influence proprioceptive postural stability in young subjects. There are no significant differences in proprioceptive postural stability among subjects with low, medium and high physical activity.

Abstract #25

Risk Factors in Hamstring Muscle Injuries in Professional Football Players. A Systematic Review

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Context: Hamstring injury accounts for a significant percentage of all acute muscle injuries that may occur during one's own professional or amateur sporting activities. In addition, this lesion often presents a high risk of recurrence in this area, which usually occurs within the first few weeks after returning to the team with normal training. As for the most frequent location, the literature reflects the long portion of the femoral biceps as the place where muscle damage is usually located. This muscular group has the capacity to produce great forces, which can produce an important impact in those sports situations that imply accelerations, high speed actions and changes of direction. Several factors have been considered as favoring the risk of injury. This can occur due to a single factor, but it is most likely that on most occasions the injury will occur because of the action of a set of several factors. Based on the above, in the present work we intend to analyze which are these risk factors that bear a direct relation with the appearance of the lesion taking as reference, the scientific evidence existing in the current literature.

Objective: identify risk factors for hamstring injuries in football, through a systematic review of articles published to date. Data Sources: Scopus, PubMed, Science Direct, Ebsco databases.

Study Selection: Included in the review were those studies that had the following selection criteria: studies that had as subjects to professional soccer players, studies that allowed calculations of relative risk or attributable risk, articles that deal with the risk factors of the hamstrings. Those articles referring to rugby, American football or Australian football were excluded, as the word "football" refers to the sport in the search for American and Australian databases. In addition to those articles in which amateur, young or female players participated and those who could not isolate the data. Both the search and the selection of the articles was done in pairs, being defined the time frame of the articles to study in the last 10 years (2006-2016).

Data Extraction: Out of the 1035 publications researched, only 8 studies met the inclusion criteria and were published between 2009 and 2014. The main risk factors associated with the hamstring in professional football are: the duration of the winter holidays, the different fields used for practice or matches, asymmetries in the musculature, different European regions, the player's position, previous injuries, the time of year, age and recovery days between games.

Data Synthesis: Despite conflicting results in the current documentation there are more risk factors that should be analyzed and included for a future comprehensive review. Yet these have not been performed on professional football players.

Conclusions: The risk factors identified in this review are : the different pitches used for training sessions and games, asymmetries in muscle, previous injuries, the time of year, age and recovery days between games.

Abstract #26

Reliability of the Quantitative Assessment of the Ischiosural Musculature by Ultrasound

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Introduction: Currently the possibility of performing an image test with an ultrasound in comparison to Nuclear Magnetic Resonance is far more economical and viable. Among its uses, it can be found the quantitative assessment of different structures. including the muscular uterus. During the lesions recovery process, it is especially useful as it allows to detect muscular atrophies and perform a more specific work of the musculature. There are different protocols for the quantitative measurement of ischemic muscles, being Abe (2014) and Nagano (2015) two of the most representative ones. Also, a new protocol is proposed, which considers the perimeter of the thigh to locate the measurement point. The aim of this study was to determine the points of the hamstring crosssection measuring points by means of an ultrasound with greater reliability, both intra and interobserver. As a secondary objective, it was studied whether the examiner's experience could have influence in the interobserver reliability.

Methods: Eight soccer players, both men and women, were randomly selected, with a mean age of 20.63 ± 4 years. The benchmarks, according to each protocol, were marked on the thigh of the player, using a different color for each protocol. The experienced examiner began measuring, making two measurements of each point described. Subsequently the novel examiner performed the same measurements as the previous experimenter to check the inter-observer reliability of each protocol. At an interval of 30 minutes, the experienced examiner retook a third measurement of the previously measured points to check the intra-observer reliability of each of the protocols.

Results: A good inter-observer and intra-observer correlation index was observed in each of the three protocols, with Abe showing the lowest correlation between inter (ICC=0.767) and intra-observer (ICC=0.857). Both Nagano protocol and the proposed one showed excellent correlation results both inter (Nagano ICC= 0.984 and Prop ICC= 0.989) and intraobserver (Nagano ICC= 0.986 and Prop ICC= 0.994) and there are no statistically significant differences between the two protocols.

Conclusions: A good correlation index was observed in each of the three measurement protocols used, with the highest inter- and intra-observer reliability being the Nagano protocol and the proposal created for this study. This preliminary study shows a good reliability, making it necessary to continue expanding the sample to check if there are statistically more significant differences in each of the protocols used.

Abstract #27

Normative Data of Flexo-Extension of the Knees, With Agonist/Antagonist Ratio

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Introduction: Knee injuries are one of the most frequent injuries in sport. So, it reveals the most serious health problems, whatever the age, and in almost every sport. Isokinetic and isometric assessments have been demonstrated to be accurate strength measurements of knee flexion and extension. The strength ratio between the hamstring and the quadriceps are commonly used to describe the dynamic stability of the knee. The conventional index is the most widely reported ratio in scientific literature, and it is estimated by dividing the maximum couple of the hamstring by the one of the quadriceps, on concentric/concentric form. A ratio of 0.6

at a speed of 60°/s, is considered to represent normal knee function. A strength imbalance greater than 10-15% of the bilateral index through an isokinetic test FR/ERCON60° could indicate that the rehabilitation program was unsuccessful, which prevents sportsmen to train and/or compete safely. For the professional football players, we can define as normal a value of 0.47 for the strength index FR/ERCON60°. In the literature, differences in isometric and isokinetic strength have been demonstrated between genders, with: women achieve 55.9% to 63.0% of the men's values.

Study Aims: To identify isometric and isokinetic concentric/ concentric maximum strength normative data at 60°/s and 120°/s of flexo-extension of the knee, and its ratios agonist/antagonist on healthy subjects, as well as its changes according to the sex and the dominance.

Methods: An observational study, with a sample of 19 subjects, of which 8 were men and 11 were women, with 89% of them right-handed, an average age of 25.36 years (+/- 4.32), a height of 170.15 cm (+/- 11.20), and a weight of 66 kg (+/- 12.96). An isokinetic dynamometer BTE-Primus was utilized to measure: isometric and isokinetic strength of flexo-extension of the knee. The statistical analysis of the study's variables get done with Kolmogorov-Smirnov and the test of the T Student.

Results: Men produce a superior strength of 43% compared to the females, but there are differences of average according to the sex and the dominance. Despite differences in strength between men and women, the force index H/Q remains the same, which means that, with healthy subjects, the quadriceps or hamstring's strength can change according to the sex, but the strength index does not change. According to the sex: ratio H/Q isom p= 0.110, ratio H/Q 60° p=0.852, ratio H/Q 120° p=0.533. P>0.05 statistically significant differences do not exist. According to the dominance: ratio H/Q isom p= 0.394, ratio H/Q 60° p= 0.672, ratio H/Q 120° p= 0.291. P>0.05 statistically significant differences do not exist. The H/Q ratio on both dominant and no dominant sides increases according to the angular speed of the dynamometer, due to the increase of the hamstring's strength. H/Q isom $0.522 < H/Q 60^{\circ}$ 0.624 < H/Q 0.690. With the women, the strength of the hamstring increases according to the speed, and the quadriceps's strength decreases. That explains the increase of the H/Q ratio according to the speed. Strength of hamstring: isom 108.94 Nw / 60°s 130.50 Nw / 120°s 139.59 Nw. Strength od cuadriceps: isom 223.50 Nw / 60°s 218.59 Nw / 120°s 202.45 Nw. In the case of men, the phenomena is different, because the strength of the quadriceps increases according to the speed, but the ratio is still increasing.

Conclusions: For the ratios of agonist/antagonist strength of isometric and isokinetic flexo-extension of the knee of 60°/s and 120°/s, statistically significant differences do not exist in the variation of the maximum strength according to the gender and the dominance.

Nevertheless, there are statistically significant differences in the maximum isometric strength and isokinetic C/C at 60° /s and 120° /s of knee flexo-extension, depending of the sex.

Abstract #28

Muscle Chains Stretching Effect for Chronic Pubalgia in Athletes

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Context: The Chronic Groin Pain is used to be associated with painful symptoms in the pubic region during more than 2 weeks. Busquet's muscle chains are defined as circuits in continuity of plans and direction through which come the organizing strength of the body. Groin pain could affect Flexion Muscular Chains, and Closed Crossed Muscle Chains. Regarding inguinal pains related to the adductor muscles, it has been reported that they represent the 58% of the inguinal injuries in sports, and the 69% of the inguinal injuries in football players specifically. It is assumed that sports, which mainly imply the use of inferior members and quick changes

of direction during the game, predispose an athlete to dose injuries. This happens more frequently in sports (e.g. *football, rugby, Australian football, hockey, and ice-hockey*) that imply repetitive sprints, changes of direction, repetitive and explosive movements done by the inferior members, and sudden stops while running. Inguinal injuries represent between the 4% and the 16% of all the lesions each season; they have an estimated incidence of 0.59-3.5 lesion per 1,000 hours of training. Besides, they have a high rate of recurrence, between the 15% and the 31%. The aim of this study is to corroborate the decrease of pain by applying a treatment such as the busquet's muscle chains methodology for Flexion Muscular Chain and Closed Crossed Muscle Chains.

Methods: We present a randomized clinical trial in which the subjects participating in the sample were assigned to two groups: Control Group and Experimental Group. Inclusion criteria are: subjects between 18 and 40 years old who perform a physical exercise more than 3 times a week and suffer pain in the pubis with more than 2 weeks of evolution. All study subjects received a treatment, either a placebo or the study treatment. These treatment are 3 in one week.

Results: an initial test was performed before the treatments were applied and a measurement was performed after the interventions. The pressure pain threshold in the pubis was assessed using a pressure algometer, this was used on two trigger points of the anterior rectum of the abdomen and on three trigger points of the long adductor muscle; As well as with a Visual Anlogic Scale (VAS). Mobility was assessed using the Downing Test. The strength of the muscles was measured by an isokinetic dynamometer. The treatment in the Control Group consisted of three 30-minute sessions with a series of 10-15 diaphragmatic breaths in the supine position. The treatment in the Experimental Group consisted of three 30-minute sessions in which the neuromuscular strokes on the diaphragm, stretching of the lower limb flexion muscular chain, and the lower limb closed crossed muscle chain

Abstract #29

Epidemiological Study of Injuries at the High Performance Academy of the Club Atletico de Madrid

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Introduction: Football is undoubtedly the most popular sport in the world, since its inception has had a constant evolution in the number of athletes and spectators.

Study Aims: To identify which injury and which tissue are the most common. Check which team has more player with injuries and more injuries and see at what time of the season there are more injuries.

Methods: We analyzed the data of 221 players belonging to the High Performance Academy of the Club Atlético de Madrid in the 2015/2016 season.

Results: In total we found 279 injuries, that is, an average of 1.26 injuries per player. Only 139 players have ever been injured, which gives a player a chance of being injured in a 62% in the season. Atlético de Madrid B presents an average of 3.32 injuries per player. Regarding the type of injury, the muscle injury represent 25.80% of the injuries, the ligaments 22.93% and the tendon 13.62%. For the season period, there are between 17-20 injuries in the months of August, September and October, 23-27 in the months of November, December and January and 37-41 in February, March and April. As for the median of the duration of the injuries, this is of 10 days, being the average almost 19 days. 47% of players are not able to play for less than a week.

Conclusions: The age and the level of the competition are key to determine the number of injuries of the players. We see that as the competition progresses, the number of monthly injuries increases progressively until the end of the season, when they begin to fall.

Abstract #30

Difference Between Genders in Relation to the Pressure Pain Threshold of Trigger Points Within the Quadriceps

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Context: Trigger points (TrPs) are tender points within taut bands of muscles and can alter movement patterns. There are two types of TrPs, active and latent. The presence and severity of TrPs can be classified with the pressure pain threshold (PPT). There is growing evidence of an association between TrPs and knee pathologies such as patellofemoral pain syndrome or knee osteoarthritis. Patellofemoral pain syndrome and knee osteoarthritis may be on a septum. Female are more susceptible to TrPs, patellofemoral pain syndrome and knee osteoarthritis.

Methods: Twenty-nine (15 male, 14 female) were assessed for the presence of TrPs (PPT less than 30.00 N) in their standing leg – if they were to kick a ball – using the flat palpation method. The PPT was measured using an algometer. The pressure was applied to the TrPs at a rate of $1N \cdot s^{-1}$ until the subject reported the change of the pressure to pain. Mean PPT was measured for the most severe TrP at each region. Independent t-tests were calculated for between gender differences.

Results: There was a significant difference between genders for the mean PPT at the middle-VL (p=0.039): female (21.86 [95% CI: 19.11-24.61] N) male (26.26 [95% CI: 22.85-29.67] N); distal-VM (p=0.047): female (20.97 [95% CI: 18.23-23.72] N), male (24.46 [95% CI: 22.18-26.75] N); middle-VM (p=0.046): male (22.66 [95% CI: 21.08-24.25] N), female (19.74 [95% CI: 17.65-21.83] N). There was no significant difference for gender at the distal-VL (p>0.05). The PPT at both regions of the VM were less than the PPT at the two regions of the VL regardless of gender.

Conclusions: There was a between gender difference in three regions of the VL and VM. These findings are similar to those of Chesterton et al. This may be due to muscle architecture, biomechanics, hormones, strength, or muscle activation which may lead to muscle fatigue.

Abstract #31

Epidemiology of Injuries in Professional and Amateur Spanish Padel Players

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Introduction: Padel is a racket sport which is hybrid between wall sport and net sports. Considering both the lack of studies that analyze padel injuries and the fact that it is a sport practiced by millions of players, this study sought to analyze the epidemiological features of injuries sustained by padel players within the Community of Madrid

Methods: Epidemiological, observational, descriptive, retrospective cross-sectional study. 154 padel players fulfilled the inclusion criteria and were included in the study. All participants signed informed consent prior to the data collection. Gathered all the injuries occurring between January 1 and December 31, 2015. This study included all the injuries occurring during padel training or competitions. All sessions took place on artificial grass or carpeting.

Results: The injury rate was 2.75 injuries per 1000 hours sports practice. The injuries affecting the lower limb (41%) were the most frequent, regarding the exact location, the most affected area was the elbow (20.48%). Tendinous injuries were most frequent (40.4%). Epicondylitis was the most frequent injury: 20.5%. The most frequently noted cause of injury was non-contact injuries, repre-

senting 68% of the total, observing a considerable association between this injury mechanism and injuries affecting the shoulder and elbow (p=0.000). Mild injuries were the most frequent with 44%. In padel, 40% of injuries do not require health assistance nor do they require daysThe 57.2% of injuries occurring during padel practice did not produce any sequelae.

Conclusions: The paddle has an injury similar to other racquet sports. The lesions are of a mild nature and because of non-contact, they mainly affect the lower limb, being the most common pathology epicondilitis. Dan the exponential increase in padel players it would be advisable to carry out further studies on injuries in this sport, providing a Safer practice and that help in minimizing the lesional risk factors.

Abstract #32

Current Trends in Treatment and Return to Play Decisions After a Lateral Ankle Sprain

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Context: While lateral ankle sprains (LASs) are one of the most common athletic injuries, there is still very limited information regarding best practices in return to play decision making. One potential consequence of this lack of information is the high rate of re-injury and recurrent instability that often follows an initial injury. The first step in trying to reduce the prevalence of recurrent injuries is to better understand current healthcare practices in the high school and collegiate setting. Therefore, the purpose of this study was to describe the current clinical practice and return to play timeline when treating LASs in the high school and collegiate settings.

Methods: 7888 athletic trainers (ATC) working in a high school or college setting were included in the study. Participants were requested to complete an electronic survey, which focused on their current practices to treat and rehabilitate LASs, as well as the timeline for return to play decisions. A 22% response rate yielded 1765 responses, 259 responses were excluded, as the respondents were not currently working clinically. Of the 1506 responses 763 responses were male and 743 were female with an average age of 35.2 ± 10.3 years. At the time of the survey the current employment breakdown was high school (n=715), Division 1 College (n=312), and Other College (n=479). The survey contained 40 items, consisting of yes/no, categorical and Likert-scaled questions. Face validity was determined by a group of athletic trainers and sports injury researchers. Day-to-day reliability was evaluated prior to administration of the survey(r = 0.79).

Conclusions: This cross-sectional investigation identifying current practices of treating LASs provides evidence regarding the expedited return to play in high school and collegiate athletics. Additionally, this evaluation shows the inconsistency in the utilization of objective measures, whether they are clinical or patient reported, to make return to play decisions. Future studies should strive to identify how these expedited return to play decisions impact the long term consequences following a LAS.

Abstract #33

Minor Cervical Instability as a Risk Factor for Concussion in Professional Rugby Players: A Pilot Study

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Background: Concussion awareness has followed an exponential increase towards contact sports in the last few years. Traditionally, a direct blow on the head has been considered the main concussive mechanism, but exceeding cervical joint limit with no direct impact on the skull also seems to be able to trigger the phenomenon in National Football League (NFL) players. The aim of

this study is to observe the relationship between minor cervical instability and concussion risk. In addition, to understand why fatigue increases the concussion risk in professional martial artists, and if this fatigue could affect cervical stability and thus making the fighter more likely to become knocked out. If there is an existing relationship between cervical stabilizing muscles' endurance and concussion risk, it may be possible to implement an intrinsic safety measure and/or to reduce return to play periods after concussion. The objective is consider if minor cervical instability is related to the number of suffered concussions.

Methods: Cross-sectional descriptive study. The endurance of deep cervical muscles was assessed with the Deep Neck Flexor Endurance Test performed by professional Spanish national rugby team players (n=17) present at the February 2017 concentration held in in Guadalajara. A subjective cervical instability perception scale was designed and both results were matched to the number of concussions suffered in the past two years. As an exclusion criteria, scoring \geq 25% in the neck disability index or undergoing cervical pain that withdrew the player from competition in the past 3 months.

Results: 17 professional rugby players (mean age 29 ± 3.9 years, mean weight 98 ± 11.07 kg and mean height 185 ± 7.27 cm) took part in the study. The Deep Neck Flexor Endurance Test mean outcome was 51 ± 25.72 , and a mean score in the subjective scale of instability of $24.28 \pm 15.97\%$, whilst an average of $4.29 \pm 5.29\%$ was obtained upon neck disability index. A significant correlation was found between the number of concussions and cervical instability (p<0.001) and a non-significant link between the subjective instability scale and the number of suffered concussions (p = 0.516).

Conclusions: Results follow a relationship between concussive rate and minor cervical instability, but not between this rate and subjective instability perception.

Abstract #34

Influence of Closed Kinetic System on Global Myofascial Improvement and Low Back Pain

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Context: Sport witnesses' frequent low back pain and myofascial syndrome accompanies it. Low back pain is pathological and occurs in about 80% of people at least once in their life. Due to this high prevalence, we can describe it as a public health problem and with great social and economic repercussions. The pain varies according to the postures and the physical activities. It establishes the annual prevalence between 22 to 65%. According to EPISER 2000, the prevalence of low back pain in Spain at the time of examination of an adult population over 20 years old was 14.8%, and chronic low back pain was 77%. He places the number of people who went to their doctor for this reason in 1.2 million in a period of 6 months. According to the book of "Guidelines for the plan of action and follow-up of low back pain", the United States invests more than 33 billion dollars in direct costs on low back pain and when it is added absenteeism in the workplace for this reason, 100 billion dollars could be reached annually. About 80% of patient with low back pain present myofascial syndrome. It would be possible, by improving the totality of the physical qualities of the body, low back pain and myofascial syndrome can be combated.

Objective: Does the improvement of the body's physical qualities positively influence myofascial conditions and decrease low back pain?

Methods: A longitudinal observational study that, after obtaining informed consent from 28 voluntary subjects with Subacute and Chronic low back pain, during 30 alternate days performed a physical activity concatenated on a patented instrument (P201231500) with a registered methodology of body mobility concatenation. Four series of twelve repetitions at 60% of 1RM. The sitting subject performs with force interacting with the instrument to perform kyphosis movements with cervical flexion, knee extension and dorsal flexion of the feet, while pushing the arms forward. Then extending the entire spine while flexing the knees with plantar flexion of the feet and pulling the arms back with flexion of the elbows. There were computer records of the following variables: Quality of life questionnaires (SF 36), Oswestry index, and Visual Analogue Scale (VAS), progressive assessment of the dorsal and lumbar segments, upper and lower limbs strength. Statistical analysis using the IBM SPSS STADI-STICS 22 package, lineal model of repeated measures and the post hoc was evaluated through the Boferroni, Tukey and DMS tests.

Results: The results obtained in the variables analyzed above indicated, were statistically significant with p < 0.05.

Conclusions: The method and instrument: Decreases the intensity of low back pain. Decreases disabilities. Improves flexibility and overall elasticity. Essential element to treat myofascial syndrome too. Improves the dorsal, lumbar and upper and lower limbs. Improves the degree of satisfaction in different items that contributes to the motivation and adherence to the proposed physical activity. Based on the results obtained, we can consider the proposed method and instrument to be efficient enough to improve low back pain, reduce the degree of disability and adapt cost-effectiveness in this concept, thanks to myofascial improvement.