Principles of Exercise, Coaching and Rehabilitation Module Code: STYD03

Knowledge and understanding of exercise prescription

When a patient is infected with an illness or disease he or she is normally prescribed some sort of medicine this is done to treat the patients symptoms and help cure the illness and or disease. This treatment style is also used when a patient has a muscular skeletal injury. A detailed exercise programme is designed for the patient to treat the muscular skeletal injury this is to aid rehab and ensure that the patent makes a full recovery. Exercise prescription can also be used as a form of prehab for patients that are at a higher risk of injury due to underlying biomechanical issues like pes planus, muscle imbalance, improper posture, etc. (Kraemer et al 2004). Before using exercise prescription a need analysis should be done. In order to an effective training programme pre-exercise screening and needs analysis of the patient needs to be done. A needs analysis highlights the physical and sporting demands an athlete may face as well as an extensive athlete profile. These are done to ensure a specific plan can be produced to reduce the injury rate and enhance performance (Shephard 2015).

When prescribing an exercise programme to a patient pre-exercise screening can be used to reduce the risk of unwanted responses to exercise. The most common pre exercise screening questionnaires used are the PAR-Q (physical activity readiness questionnaire) and the fitness facility pre-participation screening questionnaire. (Thompson, P. D et al, 2013). The result from these questionnaires stratifies the patient into three risk levels. Low risk patients are females under 55 and males under 45 with one cardio vascular risk, moderate risk patients are females over 55 and males over 45 with 2 or more risk factors, high risk patients are anyone who has pulmonary, metabolic or cardiovascular disease and or someone who demonstrates signs and symptoms related to those diseases. Shortness of breath at rest or at low levels of exertion, dizziness, paroxysmal nocturnal dyspnoeal, Orthopnoea and pain and or discomfort in the chest, head, neck and arms that could be related to ischaemia.

The validly of the training programme prescribed depends on the following five principle: type of exercises, the specific of the workouts, the length , the frequency and the intensity of these workouts all have an impact on the effectiveness of the training programme given to the patient. (Kirkham, A. A et al, 2018). Each of these principles refers to a different component which affects a training programme. Type of exercise refers to different modes of exercise training anaerobic, aerobic, resistance, balance and flexibility. Length and frequency refers to the how long an exercise is performed for too long or too many reps and sets could cause more damage to the patient to short or a small amount of reps and sets won’t provide the necessary output for improvement. Intensity of a workout can be measured in different ways target of heart rate working in the necessary training zones of 60 to 65-85% of maximum heart rate or using the BORG scale (RPE) to measure the perceived exertion level. (Singh, M. A. F, 2002).

Risk factors that can contribute to the Ankle sprain

An ankle sprain often refers to an injury of one or more of the ligaments surrounding the ankle joint. The lateral ligaments refer to the anterior talofibular (ATFL), Posterior talofibular (PTFL) and Calcaneofibular (CFL) which all work to resist from over inversion of the foot and are on the lateral side of the ankle. The deltoid ligament can be found on the medial side of the ankle and works against the over eversion of the foot. Ankle sprains are the most common injury in sports it accounts for 30% of all injuries (Yeung et al 1994).Previous ankle injuries increase the risk of future sprains as the risk of an patient to re-injury their ankle compared to a patient who hasn’t increases by four times the amount. Almost half of all patients that have had sprains reinjure their ankle within the first six to twelve months because of how long the ligaments that are affected in the previous sprain can take up to fully recover it can take up to 6 months for maximal strength to return post injury as well as the loss of proprioceptive reaction time due to the damage done to the ligaments post injury. (Bahr et al 1997).The consistent spraining of an ankle can cause chronic ankle instability (CAI) which can become detrimental to quality of life as it can begin to affect a patient when they are doing non sporting actives like walking and standing.

Lack of muscle strength and endurance as well as muscle imbalances is a risk factor when assessing reasons for why an ankle sprain may occur. (Baumhauer, J. F et al, 1995) The difference in dorsiflexion and plantarflexion strength in the ankle had a direct correlation in the patients they had a lateral ankle sprain compared to the ones that didn’t. When tested if the mean if a patient’s plantarflexion strength was between 93-124 this patient would be at a higher risk of an ankle sprain. Patients that had a smaller gap in their plantarflexion compared to the dorsiflexion were less at risk. High levels of strength in plantarflexion as well as decrease range of motion during dorsiflexion in the ankle are seen to be a large indicator to someone who is at risk of a future ankle sprain (Hadzic et al 2009).

 Proprioception is the awareness of the position and movement of the body. When relating this to the ankle and its venerability to sprains having a high level of proprioception may enable a patient to be able to be aware of the chance of an ankle sprain while it’s happening and be able to stablish them before and inversion or eversion sprain occurs. (Hoffman, M et al1995).Training proprioception of the ankle often mean balance training, this is effective use of proprioception training as it involves the use of the whole body and can be used in a sport specific way (Donath et al 2017). Plantar flexion is preformed using the gastrocnemius and soleus muscles, when landing after a jump your foot is plantar flexed so when a sprain occurs due to a land it is often limited to a lack of stability and weakness in the muscles responsible for the joint action. Strengthening of the soleus and gastrocnemius muscles by doing standing calf raises and seated calf rises will improve your ability to stabilise the ankle joint.

**References**

 Yeung, M. S., Chan, K. M., So, C. H., & Yuan, W. Y. (1994). An epidemiological survey on ankle sprain. British journal of sports medicine, 28(2), 112-116.

Bahr, R., & Bahr, I. A. (1997). Incidence of acute volleyball injuries: a prospective cohort study of injury mechanisms and risk factors. Scandinavian journal of medicine & science in sports, 7(3), 166-171.

Baumhauer, J. F., Alosa, D. M., Renström, P. A., Trevino, S., & Beynnon, B. (1995). A prospective study of ankle injury risk factors. The American journal of sports medicine, 23(5), 564-570.

Kraemer, W. J., & Ratamess, N. A. (2004). Fundamentals of resistance training: progression and exercise prescription. Medicine & Science in Sports & Exercise, 36(4), 674-688.

Singh, M. A. F. (2002). Exercise comes of age: rationale and recommendations for a geriatric exercise prescription. The Journals of Gerontology Series A: Biological Sciences and Medical Sciences, 57(5), M262-M282.

Kirkham, A. A., Bonsignore, A., Bland, K. A., Mckenzie, D. C., Gelmon, K. A., Van Patten, C. L., & Campbell, K. L. (2018). Exercise prescription and adherence for breast cancer: one size does not FITT all. Medicine & Science in Sports & Exercise, 50(2), 177-186.

Thompson, P. D., Arena, R., Riebe, D., & Pescatello, L. S. (2013). ACSM’s new preparticipation health screening recommendations from ACSM’s guidelines for exercise testing and prescription. Current sports medicine reports, 12(4), 215-217.

Shephard, R. J. (2015). Qualified fitness and exercise as professionals and exercise prescription: evolution of the PAR-Q and Canadian aerobic fitness test. Journal of physical activity and health, 12(4), 454-461.

Hadzic, V., Sattler, T., Topole, E., Jarnovic, Z., Burger, H., & Dervisevic, E. (2009). Risk factors for ankle sprain in volleyball players: a preliminary analysis. Isokinetics and Exercise Science, 17(3), 155-160.

Donath, L., Roth, R., Zahner, L., & Faude, O. (2017). Slackline training (Balancing Over Narrow Nylon Ribbons) and balance performance: a meta-analytical review. Sports Medicine, 47(6), 1075-1086.

Hoffman, M., & Payne, V. G. (1995). The effects of proprioceptive ankle disk training on healthy subjects. Journal of Orthopaedic & Sports Physical Therapy, 21(2), 90-93.