

Passive Vascular Treatment

Using intermittent positive current and negative current (IVT) vacuum therapy for muscle injuries



Hugo de Oliveira Lopes and Vitor Pimenta
Clube Desportivo das Aves, Portugal

Approximately 30 % of injuries in professional football are due to muscle problems, resulting in about 27 % of playing time lost due to injury [1]. An average of 6 muscle injuries per 10 player per season on a 25-player team means approximately 15 muscle injuries per team during the season. Up to 97 % affect the lower limbs, mainly the hamstrings (37 %), adductors (23 %), quadriceps (19 %) and leg muscles (13 %) [1].

Due to the heterogeneity of lesions and in some cases to internal hematoma/edema, the correct application of measures to reduce peripheral swelling/vasoconstriction is particularly important. In this paper, the authors present a practical case study involving the daily use of intermittent vacuum therapy (IVT) in an athlete with muscle injury. Other usual therapies in muscle injuries have also been used.

Hugo de Oliveira Lopes (left)

is Doctor of the Grupo Esfera Saude, being technical director of the Famalicão Unit, Technical Director of SCM Amarante UCC and responsible for the Medical Department of the Clube Desportivo das Aves, Portugal.

Vitor Pimenta (right) is Physical Recovery / physiotherapist of the Clube Desportivo das Aves. From 2015 – 2016 he was External Physical Recovery Real Madrid CF. Also he works since 2004 at the Pimas Physical Recovery Center, Vila do Conde, Portugal.

Method of application

IVT applies alternating negative pressure (vacuum) with positive pressure on the lower limbs to the abdominal region, as a way to increase capillarization as well as venous and lymphatic return. The central nervous system is also stimulated by the application of this technique. As no direct compression is involved, the treatment is completely painless regardless of the injury or its stage. The main applications of the VACUMED® Flow Regeneration System, developed at the German Aerospace Center (DLR), are cardiovascular stimulation and revascularization. IVT is also recognized as a modern and economical form of treatment for lymphedema and cellulitis. The procedure is also used differently to promote post-traumatic and postoperative rehabilitation (VACUSPORT® device) and, for several years, has been used very effectively for traumatic sports injuries. When the vacuum pump is on, a pressure difference is generated with the lower pressure in the legs compared to the free upper limbs of

the chamber. This leads to an increase in the blood flow in the lower part of the body thus optimizing the circulation in this zone of the body.

Case Study

Athlete, 31 years old, with no history of muscle injury. It presents pain on the inside of the right thigh during a football match that involved replacement. Ultrasound showed a muscular rupture of the major adductor at its myotendinous junction with about 2 cm in the sagittal plane and 8mm in the coronal plane – grade IIb according to British athletics muscle injury classification. The next day after the injury started rehabilitation program which includes daily treatment session with Vacuosport (program 13 – 30min). On the 14th day after the injury the athlete was training integrated with the rest of the team without any type of restriction. To date, no new injury has been recorded on the muscle referred to above.

Discussion/Conclusion

According to the literature, lesions of this type have an average recovery time of 4 – 6 weeks, and in veteran athletes the risk of recurrence of this lesion is 5x increased. In this study, we found that we were able to reduce the stopping time to half the usual time, and also avoided recurrence of injury. We believe that Vacuosport therapy has had a positive impact on the athlete's recovery and is an asset to any medical department. The authors acknowledge a great difficulty in doing study against placebo in high competition athletes since considering the great beneficial benefit of Vacuosport therapy they do not admit to delaying the recovery of the injury of their athletes with placebo.

Sample

Group of 8 athletes, with lactic acid measurement at rest, 30 minutes before a strength

training. After 75 minutes of strength training, they were reevaluated in the 5 minutes following the end of the training, with lactate levels significantly increased. After lactate measurement they were subjected to intermittent Vacuosport therapy for a period of 45 min. This program was carried out during 6 training sessions in one week. With each passing day the lactate level was dropping significantly, and the big gains were when the treatment was performed at Vacuosport where lactate levels dropped significantly to the point of being shorter than in the rest period. With this we were able to reduce the fatigue threshold and reduce the number of injuries, and to date no muscle injury has occurred.

Procedure

Table comparsion day 3

ATH-LETE	30 MINUTES	5 MIN. AFTER TRAINING	AFTER VACUSPORT
Player 1	6,9	9,7	5.1
Player 2	7,0	11	6,9
Player 3	9,8	11,2	9,9
Player 4	4,2	7,4	2,8
Player 5	16,3	17	11
Player 6	6,8	11	4,2
Player 7	15,8	19,5	12
Player 8	3,4	5,2	3.0

Discussion/Conclusion

Although there is as yet no scientific evidence or literature to prove the efficacy of this therapy in the removal of lactic acid, we have been able to present and demonstrate very interesting results, which should be studied, since it is clearly defined that Vacuosport intermittent therapy is a an interesting and efficient tool in the removal of lactic acid, thus being able to delay the onset of fatigue and consequently prevent any overuse muscle damage.

Literature

- [1] Ekstrand et al. *Epidemiology of muscle injuries in professional football (soccer)* Am J Sports Med. 2011