

Case study: The role of geko™, a portable neuromuscular electrical stimulation device, in treating lateral Tibial pain, swelling and spasm following a high Ankle sprain.

Authors:

Kate Rees
Head Physiotherapist, Swansea City Football Club

Subject

The subject is a 27-year-old male professional footballer.

Relevant Clinical History

The player sustained the injury during a match. The mechanism consisted of the player being tackled and landing onto a forced plantar flexed foot. He felt immediate pain but was able to carry on. However he was substituted tactically and removed from the field of play 5-minutes later. The following day his pain had lessened but he was experiencing difficulty walking.

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The ankle presented with swelling around the lateral aspect extending up into the leg. The pain was reported in the corresponding areas. On examination there was reduced range of movement in all directions. There was some mild pain on manual muscle testing into an everted position, stressing the peroneal muscles. On special testing, the anterior drawer showed some laxity with a firm end-feel and the 'crank' test was positive for pain. Further testing was performed to the syndesmosis which found it to be stable but painful. On palpation there was tenderness around the Anterior Talofibular Ligament (ATFL) and the Anterior Inferior Tibiofibular Ligament (AITFL). These clinical findings led us to believe that there was an injury to the AITFL +/- the ATFL. Further investigations were performed including an ultrasound and MRI scan. They confirmed an injury to the AITFL with some old scarring noted over the ATFL. The player was seen by an orthopaedic consultant who advised him to wear a brace for the next 2 weeks with minimal lower limb activity out of the brace.

Rationale for treating with the geko™ device

The geko™ device was utilised for the following reasons:

To increase circulation to the LL muscles, aiding the healing process and helping to prevent deep vein thrombosis whilst the player was less active than usual. The player was also flying abroad during this period so it was used during the flight for the same reasons.

By increasing the circulation to the area, the geko™ may also aid in reducing swelling.

The geko™ was also used to reduce pain and muscle spasm in the peronei by stimulating the motor nerve of the common peroneal nerve.

The geko™ device treatment regime

The geko™ device was applied to the fibula head and pressed on to a level where a visual twitch was observed and the impulse feeling was comfortable to the player. We advised the player to be in situ for 2-hours and to complete this twice per day. The player was instructed to use the geko™ device during periods of inactivity. This was used alongside a PRICE regime and implemented over a 5-day period.

Results/Outcome

The outcomes used to measure any changes were calf circumference and the knee to wall (KTW) test.

Calf circumferences were measured 10cm from the distal patellar pole. The circumferences measured equally at time of the injury and there was no loss in circumference one week later.

KTW test was measured by a piece of tape on the floor. The big toe was placed as close to the wall as possible and the player was asked to push the knee towards the wall whilst keeping the heel placed firmly on the ground. The distance between the big toe and wall was measured. At the time of injury the measurements were 0cm on the right side and 4cm on the left side. One week later the KTW measurements were 2cm on the right side and 4cm on the left side.

The results showed no changes in calf circumference and an improvement of 2cm on the KTW measurement of dorsiflexion range of movement.

Conclusions

The geko™ device alongside a PRICE regime appeared to show no change in calf muscle bulk and improved dorsi-flexion range of motion in a premier league football player with a high ankle sprain. As this was a single case study no comparisons can be made to the natural healing process or compared to the PRICE regime alone. However the improvements in outcome measures do appear positive.

The improvement in KTW measure can be interpreted as an improvement in ankle dorsiflexion range of motion. This is often reduced when swelling around the ankle joint is experienced. The player showed an improvement in ankle dorsiflexion range after using the geko™ device for 5-days, which is likely to be due to a reduction in swelling. The KTW measure can also be a measure of the length of the Soleus muscle. Muscle spasm can be associated with pain in early injury and therefore a possible treatment rationale of the geko™ device would be for pain reduction and hence increased movement and a reduction of spasm within the Soleus muscle by increased movement around the structures caused by the muscle twitch.

Calf circumference was also measured. This can be a measure for swelling but can also be a measure of muscle wasting by measuring the circumference of the muscle. If a muscle were wasting, the calf circumference would be reduced and if there were any swelling in the crura, the circumference would be raised. This is an effect that is likely to happen within the first week of an injury. Therefore, no change in calf bulk may suggest that no muscle wasting occurred, a positive outcome for long-term rehabilitation when using geko™ in the early stages on injury.

The changes seen in this player, improvement in outcome measures and visual swelling and movement of the ankle, appeared better than previous treatments of a PRICE regime alone. However, as this was a single case study no comparisons could be made in this specific case to using PRICE regime in isolation. One must also consider the differences between individuals and their healing timescales that can vary according to age, general health alongside many more variables.

In general the player found the geko™ easy to apply and easy to use, it was comfortable to wear and we would use it again for recovery or for any further lower limb injury.

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