

# Acupuncture for low back pain in a professional footballer. A Case Report

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## Abstract

Low back pain (LBP) is a common musculoskeletal complaint reported by professional footballers (anecdotal evidence). Its prevalence can have significant financial, technical and personal implications. However, there are no defined guidelines or consensus research available for the acute treatment and longer-term management within this population. This case study evaluates the clinical application of acupuncture in the management of a 23-year-old professional footballer with chronic LBP. The player presented with a 5-year history of episodic LBP, which was primarily aggravated by straight-line-running. The treatment program consisted of: 8 sessions of acupuncture over a 2-week period in conjunction with, strengthening, stretching, education, mindfulness and core exercises as well as manual therapy and postural education. Following completion of the acupuncture treatment which incorporated points along the Bladder, Gall Bladder and Small Intestine channels, the player reported a 75% decrease in pain as measured by the Numerical Pain Rating Scale (NPRS) during running and was subsequently re-integrated back into full squad training. Salient research is examined to present a rationale for utilizing acupuncture and the proposed mechanism underpinning it. In addition, the efficacy of integrating acupuncture for the multi-modal treatment of LBP, limitations of this study and future research are also reviewed.

## Introduction

LBP in professional footballers is a common occurrence and is usually characterized by pain, stiffness and disability with or without associated leg pain [1]. Although LBP is often self-limiting and benign, it can cause a player to miss a considerable length of time from competition and in extreme cases, can be catastrophic; i.e. career ending [2].

There are several proposals for the aetiological processes, which may contribute towards LBP. These causes may be pathologically multi-faceted and synergistic, or specifically attributed to one structure or component. Various authors have proposed that patho-anatomical, physical, neuro-physiological, psychological and social factors, may all influence LBP, and their contribution can vary for each patient [3]. The very complex nature of this disorder is recognised by most in the health profession industry and so is the requirement for a multi-modal management approach. Consequently, a large variety of therapeutic interventions are available for the treatment of LBP including acupuncture. However, the effectiveness of most of these interventions has not been convincingly demonstrated and has left a “management vacuum” in its wake [4].

## Past medical history

This player presented with a 5-year history of episodic LBP of insidious onset without any radicular pain or red flags. He has a history of multiple non-contact soft tissue injuries to his hamstrings (bilateral) and right rectus femoris. He also suffered a medial malleolus stress fracture on his left side.

## Symptoms

He reported that sustained postures for more than 30 minutes, extension based gym exercises (bridging) and driving all aggravated

his condition. His symptoms of pain were eased with rest. He also complained of an intermittent, non-specific dull ache at rest (NPRS 2/10), which crescendo's to a sharp intense pain (NPRS 8/10) over the lower lumbar spinal segments of L2-L5 during high intensity running.

## On Examination

The player stood in anterior pelvic tilt with a hyper-lordotic lumbar curve. On palpation he demonstrated high tone in his erector spinae muscles and complained of tenderness over his lumbar vertebrae L2-L5. Range of movement testing for his lumbar spine and hips was unrestricted in all directions, however, he did report his pain at end range lumbar extension and side flexion (left & right). Muscle testing for power and length were all within normal limits. Hypermobility testing was negative. Sacroiliac joint and pubic symphysis joint testing for pain and function was unremarkable. In addition, neurodynamic testing was equivocal (straight leg raising and seated slump).

## Psychometric variables

Psychological factors were also identified as playing a role in this player's LBP. The player voiced his concerns on a daily basis that he felt that “something must be wrong with his back as he was in so much pain”. He displayed high levels of anxiety and cultivated an unhealthy coping strategy of avoiding running and gym-based exercises in fear that it would damage his back. He became hyper-vigilant of any lumbar sensations and reported extremely high levels of pain during running.

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## Imaging

A recent lumbar MRI did not elicit any patho-anatomical findings.

## Clinical reasoning: Pain mechanism: Neurophysiological

In the absence of any pathological findings from imaging, we hypothesized that the LBP this athlete experienced during high levels of mechanical loading (running in excessive lordosis) was driven by neurophysiological processes. Furthermore, it was clinically reasoned he had a control impairment into extension, characterized by pain provocation behavior, i.e. he had a tendency to stand and move in excessive lumbar lordosis [3]. It was speculated that repetitive end range loading of the lumbar facet joints into extension and sensitization of their associated capsules caused a peripheral nociceptive drive; manifesting as LBP [5]. Due to his long-standing history of intermittent LBP, it is reasonable to suggest that biochemical and neuro-modulation changes may have occurred at peripheral, spinal cord and cortical levels, which in essence meant that this player's LBP could be generated and sustained simultaneously at any of these levels [6].

## Rationale for utilizing acupuncture

We clinically reasoned that acupuncture would be an efficacious adjunct to the existing multi-modal management plan as various research groups and guidelines have postulated that it has an inhibitory effect on pain processing where it is anatomically experienced, at the corresponding spinal segment and also at a supraspinal level via a neurophysiological mechanism [7]. The multi-modal management plan consisted of patient education, mindfulness, functional core, manual therapy, running mechanic drills and self mobilisations. In addition, once the player was satisfied that he did not have any tissue damage and was educated how acupuncture could help manage his pain levels, he was very keen to trial this intervention.

Furthermore, following an extensive scour of relevant research, various studies have shown that acupuncture does have a positive effect on pain relief for chronic LBP especially when applied as part of a multi-modal approach, therefore, justifying its inclusion.

## Mechanism of Acupuncture

One theory based on a western evidence based model proposes that acupuncture modulates spinal signal transmission and the brain's perception of pain through a neurophysiological mechanism [8]. Insertion of the needle into the skin causes a painful stimulus that releases calcitonin gene-related peptides and histamine, thereby causing a local inflammatory response [9]. This initial stimulus also excites A $\delta$  fibers which release  $\beta$ -endorphins and enkephalins via the dorsal horn of the affected spinal segment which exert an inhibitory effect on nociceptive input through the mechanism of pain gating [10]. Thereafter, cells within the spinal cord communicate with the brainstem, hypothalamus and periaqueductal grey to release chemical neurotransmitters to block pain signals [7]. The longer lasting aching / throbbing / sore sensation after the initial sharp pain, commonly referred to as "De Qi", is said to be mediated by the activation of C-fibers and is thought to be integral to experience pain relief via descending noxious inhibitory pathways using endogenous opioid mechanisms [11].

## Clinical reasoning for Acupoints

As this player suffered from long-standing LBP, a threefold approach was applied. Five points along the bladder meridian as well as GB30 and SI3 were chosen in this case as they have been described in various literature as being effective for treating LBP. BL23, BL24 &

BL25 are reported to affect local tissue (site of LBP), while BL24 and BL25 are also described as having a simultaneous affect at a segmental level due to their location along the lumbo-sacral plexus. In addition, point selection of BL56 and BL62 were also chosen as they have a segmental affect, which in theory should increase sympathetic activity [2, 12]. GB30 & SI3 were then chosen, as they are known as "strong points", to activate central autonomic responses [8]. GB30 is a crossing point for the gall bladder and urinary bladder meridians and has been used historically to treat LBP. SI3 when coupled with BL62 (DU master point) was utilised to elicit a strong Qi response. Needles were placed in situ for 20 minutes to have a layering affect within the central nervous system [8]. Please see Table 1 for details of acupuncture sessions.

## Discussion

Clinical judgment for the application of acupuncture was ultimately defined by; the patient's idiosyncratic findings; i.e. his belief that acupuncture would work, clinical presentation; i.e. identification of neurophysiological changes locally, segmentally and supraspinally as the mechanism of pain. Contemporaneous declarative frameworks, guidelines, case studies and RCT's relevant to the application of acupuncture in athletic populations with LBP and the plateau of symptom resolution from the player's existing management plan also justified the inclusion of acupuncture.

This player was hyper-vigilant about his LBP and reported to the medical staff that he felt "running" was damaging his back and that he was no longer happy to partake in this activity. He became increasingly angry, depressed and frustrated with his condition and with those people closest to him. As a result, we spent a great deal of time educating him about LBP and helping him to introduce adaptive coping strategies such as pacing, distraction and mindfulness in particular. The player responded quite well to these interventions, but was very insistent that he wanted an MRI to put his mind at ease that there was nothing structurally wrong with his back. Therefore, given that football was his occupation and that he now felt he could not perform the activities essential to carry out his job and also that a member of the medical staff had queried the possibility of a pars fracture, we decided to image. Following an unremarkable MRI and extensive education program, the player was satisfied that there was no anatomical disruption and comprehended that pain did not necessarily equal tissue damage. Thereafter, he was a lot more amenable to accept a neurophysiological aetiology as his main driver of pain and was keen to trial acupuncture in conjunction with his existing rehab program to modulate his pain levels.

Following his first session of acupuncture the player reported that he felt "something had changed" with his condition. He reported that his lumbar spine felt "looser" and that he was happy to trial low level running the next day. He was given acupuncture on 8 occasions over the next 2-week period and his running intensity and volume was gradually increased during this timeframe as well. He also carried out mindfulness twice daily at the same time and reported that his anxiety levels and pain levels for high intensity running by the end of the 2 weeks had also decreased to a manageable level. He was happy to reintegrate back into full squad training and understood that he would have to self-manage his condition during training sessions. He continued to practice mindfulness on a daily basis and was keen to have a weekly "maintenance session" of acupuncture to maintain his pain at an acceptable level.

## Efficacy of acupuncture

Although the medical team were agreed on the introduction of acupuncture, the discernment and biasing of this treatment modality as

**Table 1.** Acupuncture Sessions

| Session Date | Acupuncture Points   | Time (min) | De Qi | Stimulation Time (min) | Outcome Measures | Adverse Effects |
|--------------|--|------------|-------|------------------------|------------------|-----------------|
| 05/09/2016   | <b>Local Points:</b><br>BL-23 BL-24 BL-25<br><b>Segmental Points:</b><br>BL-56 BL-62<br><b>Supraspinal Points:</b><br>GB-30 SI-3 | 20         | Yes   | 5                      | NPRS             | NIL             |
| 06/09/2016   | As above   | 20         | Yes   | 10                     | NPRS             | NIL             |
| 08/09/2016   | As above   | 20         | Yes   | 10                     | NPRS             | NIL             |
| 09/09/2016   | As above   | 20         | Yes   | 5                      | NPRS             | NIL             |
| 12/09/2016   | As above   | 20         | Yes   | 5                      | NPRS             | NIL             |
| 13/09/2016   | As above   | 20         | Yes   | 5                      | NPRS             | NIL             |
| 15/09/2016   | As above   | 20         | Yes   | 5                      | NPRS             | NIL             |
| 16/09/2016   | As above   | 20         | Yes   | 5                      | NPRS             | NIL             |

efficacious was still hotly debated even after a successful reintegration of the player back into squad training. Running was his most provocative functional activity and analysis of his running gait revealed decreased hip extension and increased lumbar lordosis. Running mechanic drills were somewhat effective during the rehabilitation, however there was little carry over once the player was reintegrated back into squad training as he resumed his normal “hyper-lordotic” running pattern despite ongoing intervention.

He made minimal improvements in maintaining a “neutral lumbar spine” in low level activities such as single leg step ups and downs. However, despite the lack of significant postural or mechanical change, he is pain free and has made a successful reintegration into training and playing. Therefore, one could possibly argue, that of all the interventions, acupuncture and cognitive behavioural changes had the most effect on his symptomology. Alternatively, one could just as well argue that his LBP had simply “run its course” Therefore, the question must remain open.

### Other possible Acu points

BL 40 (midpoint of popliteal fossa) is also another common point that is used to treat LBP which is a point that could have been utilized in this case. Furthermore, Huatuojiagi (HJJ) and governor vessel (GV) points could have been utilised to magnify the effects locally.

### Strengths

Qualitative data produced by this case study highlights the efficacious use of acupuncture for LBP in athletes as part of a multi-modal management strategy. It documents well the relativistic patient-therapist encounter, with multi-modal treatment and conjointly agreed patient-centered outcome measures. It also reports cause and effect, employs the simplest of several hypotheses and has internally consistent reasoning with a design most valid for the area of study. Psychometric data (NPRS) was considered the most appropriate measure, as the patient’s main complaint was pain driven by neurophysiological mechanisms. Following 8 sessions of acupuncture his NPRS decreased from 8/10 to 2/10. The success experienced by the patient in this case study should not be underestimated just because it is “level 4” evidence as phenomenological, qualitative, and person-centered data has been shown to be epistemologically worthy when compared to the randomized control trial. This type of data can perhaps be considered Gold Standard as consideration of patient values.

### Limitations

The experimental limitations of this study are numerous. Reliability of the case study is recognised as low rigour in the purest sense; no

randomisation, no reproducibility, lack of control over variables, subjective measures and no statistical analysis. The employment of a multi variant treatment plan, by very design, would reduce the ability to identify the merits of any independent treatment variable. However, it could be argued that the gestalt nature of the interventions was part of its success.

### Conclusion

The quest for an efficacious treatment of LBP remains enigmatic. The evidence presented here for the application of acupuncture for an athlete with LBP cannot be scientifically transferred to all LBP complaints within this population. However, the clinically reasoned therapist can draw from this experience and add to their reflective learning process when formulating their own idiosyncratic treatment plans. Several key factors influenced the evolving and flexible treatment program and facilitated the clinically reasoned decision for the application of acupuncture. The employment of simplistic measures of a decrease in pain, increase in function and satisfaction may not be ‘fancy’, but on the whole, it is what the patient, the football club and medical team desired. At present any attempt to advocate the use of acupuncture for LBP in athletes needs to be tempered as there is simply a lack of guideline defining robust scientific evidence available and therefore, either more research in it’s current format is needed, or a paradigm shift and perceptual reconfiguration of what constitutes valued evidence may be required to champion the use of acupuncture for LBP in athletes.

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