ACUPUNCTURE Today

BODYWORK

# USA Volleyball Players and Lumbar/Hip Joint Compensations

## INTEGRATED APPROACH TO INJURY PREVENTION

Ronda Wimmer, PhD, MS, LAc, ATC, CSCS, CSMS, SPS

Working as part of the sports-medicine team with USA Volleyball, I've learned that the key to managing potential and current chronic overuse conditions is to biomechanically anticipate strengths and weaknesses due to compensation patterns from continual practice, game schedules and traveling year round. Many of these athletes play overseas on professional teams to earn money and gain sponsorship, either through the team or through specific product endorsements here in the U.S. Compensation varies, depending upon the popularity of the sport itself and network coverage and promotion while playing for the U.S. team.

Many of the injuries seen during the season, outside of acute injuries, are: continually countering of tight muscles from repetitive squatting, lunging, jumping and landing (blocking, spiking, jump serves, digs), which all contribute to muscle compensation. In many cases, the athletes have a dominate side that tends to be the catapult. After years of playing, compression of impact-loading; rate of magnitude and magnitude of loading, creating microtraumas; and sleeping and sitting arrangements while traveling all affect muscle length. Severity is due to years of training and competitions. Over time, the accumulated microtrauma and compensation patterns seen within the lower back and surrounding soft tissues can result in increased symptoms and decreased participation and if not counterbalanced, may shorten the longevity of an athlete's career. The athletes have strength and conditioning coaches who work on stabilizing their core and strengthen weaknesses to keep their bodies as balanced as possible in order to minimize this dominance and to strengthen their game.

The hip joint is the most stable and largest joint in the body and includes muscles that trigger lower-lumbar muscle compensation and vice versa. The body is amazing in that it does compensate. In most cases, the individual is completely unaware of this until pain is experienced. The knee and ankle joints also are key components in biomechanical compensation patterns. However, for the sake of simplicity, we will focus on the lumbar and hip joints.

The primary stabilizers of the lumbar include the quadratus lumborum, the iliocostalis lumborum, the interspinalis lumborum and the lateral intertransversi muscles. Ranges of motion (osteokinematic motion) include: lumbar flexion, extension, right/left lateral flexion and right/left lateral rotation. Joint capsule motions (arthokinematic motion) include a gliding or sliding motion of the facet articulations. The hip joint muscles posteriorly include: the gluteus maximus, gluteus medius and gluteus minimus, piriformis, obturator internus, gemellis superior/inferior, obturator externus, biecep femoris, semitendinosus and semimembranosus. Anteriorly, the rectus femoris, vastus group (lateralis, intermedius and medius), iliopsoas, tensor fascia lata and Sartorius are affected. Medially, the pectineus, adductor group (longus, brevis, magnus) and the gracilis are affected. Laterally, it's the iliotibial band. The gross movers of the hip joint include the hip flexion, extension, adduction and

abduction, and internal/external rotation. These are all of the muscles that trigger compensation patterns affecting the lower lumbar that can create low back pain.

Dealing with athletes really is no different than dealing with the general population because muscles compensate regardless. The difference is in what degree these compensations take place. For example, a player is right arm-/left leg-dominant. The compensation pattern will show up with sacroiliac joint subluxation with pain on the dominant side. However, if the hip flexors are tight on the opposite side, then the compensation will pull to the nondominant side, due to a pelvic tilt and/or rotation. This dramatically affects the efficiency in athletic performance, even with just a little compensation. So, the key becomes to identify compensation patterns as quickly as possible and counterbalance them. This requires continual maintenance, educating athletes, and working with the head trainer, strength and conditioning team, chiropractors, physical therapists and medical doctors. Acupuncture is being used slowly more and more by these athletes after surgery for lumbar pain, recovery and to boost the immune system, among other conditions. The key to this application within this environment is the head trainer. Coaches and athletes are hearing of the results from other athletes who have had acupuncture, especially those who have played in Japan. Much of what I do is explain what is happening and let the results speak for themselves.

During the assessment, I get a history from the head trainer, then I palpate and muscle test to identify which muscles are firing, looking for the compensation patterns. In many cases, you can observe in gait and how the athlete is standing. In other cases, more specific muscle testing is used to identify problematic muscle pattern. This is done by knowing what the gross movements are for each individual muscle. Fire the muscle by doing resisted range of motion and identify strengths and weaknesses in neuromuscular patterns. This isolates what muscles to focus on.

In Oriental medicine, we can counterbalance Sp *qi* deficiency, Liv *qi* stagnation, K *yin yang* deficiency, *qi*/blood stagnation and deficiency, channel/vessel/meridian obstruction by muscle-testing and specifically identify the involved muscle. Then, I treat with acupuncture and electro-acupuncture stimulation, but also by supporting underlying conditions and anticipating compensation patterns of both musculoskeletal and patterns of differentiation involvement. TCM diagnostic methodology is very valuable within the sports medicine arena because we can prevent conditions from occurring.

Once the muscle is isolated, then treat the affected vessel/channel/meridian with local, distal and adjacent points, on which I prefer using electro-acupuncture. The muscles isolated will determine what channels/vessels/meridians will be used. Using TCM diagnostic methods, other supporting acupuncture points can be implemented to counterbalance and/or as prevention for performance enhancement.

There are many different point combinations and herbal formula combinations that can be used. These points below are an example of points that can be implemented, but surely are not limited to these point combinations.

Typical treatments that are implemented include:

Distal points, according to affected area: Back UB40, UB59, UB60, UB62, K3, K6, K7; Sacrum UB40, UB58; Hip UB62, GB41; Knee SI5, Sp5; Ankle none.

- To implement with patient movement. Use for acute back strain. Needle on affected side. Stimulate the needle. Make sure athlete is not going to faint. Use appropriate distal point with

affected channel/vessel/meridian. Repeat two to three times. Take needle out, then do range of motion again.
- If there is a severe herniated disk, avoid completely. Main points implemented are *du* and *jia ji* points, with sedating or electro-acupuncture.
- Distal points can also be used for chronic lumbar conditions to relax and tonify/nourish muscles, using GB34, UB8 and Liv3.
- One can use the distal points to strengthen bone and marrow: use GB39, UB23, UB62, UB64, SI3 and K3.
- UB22, UB23, UB24 is primarily used for chronic stiffness and radiating pain down the leg. Adjacent point areas involved: Sacrum UB23; Hip GB31; Knee St36, Sp10; Ankle St36. Local point areas involved: Sacrum UB27; UB28, UB32; Hip GB29, GB30; Knee St36, Sp9, K10, UB40, GB34; Ankle Sp5, GB40, UB60, St41.
- Local points can be used for back/lumbar pain to treat vertebrae individual joints and/or spinal segments, as well as muscular problems associated specifically with the UB channel/vessel/meridian and the associated affected area.

Of course, *ah shi* points, local and distal points can be used for *qi* and/or blood stagnation. Other points associated with pre-existing conditions as deficiency include K/Liv points K3, Liv8, St36, Sp6, R4, UB11, UB18, UB23, GB34, GB39. For excess conditions such as blood stagnation, one can include Sp6, Sp10, UB17, LI11 and P6. If Phlegm is present then using Sp9, St40, R9 can be implemented with tonification to UB20 and R12, rather than sedation or even a method that is typically implemented with excess conditions with phlegm cases.

If *qi* and blood deficiency are present, then the addition of Sp6, St36 UB20, UB23, R4 and Liv8 can be used.

Your acupuncture and herbal prescription is based upon your individual clinical impression/diagnosis with your patient. Using acupuncture points, tuina, linaments, cupping, moxabustion, auricular therapy and herbal formulas are very effective, among others TCM modalities. There are a number of herbal formulas used. However, the problem with using herbs on professional and Olympic athletes is that they get drug tested. Some of the herbal formulas will test positive. Athletes tend to not take the formulas because of this. Therefore, acupuncture and other TCM modalities are heavily relied upon, rather than herbs.

In summary, we are hearing more and more that athletes are seeing acupuncturists and getting results. These athletes promote the effectiveness within the team environment and the head trainers, physical therapists and doctors hear about its effectiveness. This always piques curiosity as to how it works. Many of our players compete in other countries, such as Japan, where acupuncture is used quite frequently, with great results. As members of the sports medicine team are exposed to acupuncture and its benefits for athletes, a trust is starting to occur. The inclusion of acupuncturists on the sports-medicine team eventually will become integrated, as I have experienced.

The key is to be educated in both sports medicine and acupuncture. This inclusion is a slow process, due to evidence-based outcomes and lack of information about how acupuncture "really" works within the sports-medicine academics. However, using TCM, we are anticipating physiological manifestations and preventing them before the signs and symptoms occur. Oriental medicine provides this unique ability to diagnose and treat preventatively. However, it is equally important to have an understanding and appreciation of the kinesiology and biomechanics of compensation patterns, enabling more specific well-rounded treatment strategies in the clinical management of these athletes.

*Resources*


1. Cheng X. *Chinese Acupuncture and Moxabustion*. Beijing: Foreign Languages Press, 1990.
2. Wiseman N, Ellis A. *Fundamentals of Chinese Medicine*. Brookline, Mass.: Paradigm, 1985.
3. Maciocia G. *Tongue Diagnosis in Chinese Medicine*, 3rd ed. Seattle: Eastland Press, 1995.
4. Hall S. *Basic Biomechanics*. St. Louis: Mosby, 1995.
5. Prentice WE. *Therapeutic Modalities in Sports Medicine, 4th ed.* Boston: WCB/McGraw-Hill, 1999.
6. Maciocia G. *Foundations of Chinese Medicine, 2nd Edition.* New York: Churchill Livingstone, 2005.
7. Arnheim DD, Prentice, WE. *Principles of Athletic Training, 10th ed.* Boston: Mc-Graw Hill, 2000.
8. Baechle TR. *Essentials of Strength Training and Conditioning.* Champaign, Ill.: Human Kinetics, 1994.


JUNE 2007