



# PERFORMANCE VOLLEYBALL CONDITIONING

A NEWSLETTER DEDICATED TO IMPROVING VOLLEYBALL PLAYERS

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## Postural Restoration Institute Presents the New Off-Season: Balanced Regeneration- Series #8 A Final Synopsis

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*Lisa was a member of the University of Nebraska volleyball team from 1995-1997. She was introduced to the science of Postural Restoration as a patient under the care of Ron Hruska. She had suffered from long-standing injuries sustained during her collegiate volleyball career and found success with the treatment techniques she learned at the Hruska Clinic and later received from the Postural Restoration Institute. Lisa returned to practice physical therapy at the Hruska Clinic Restorative Physical Therapy Services in Lincoln, Nebraska after completing her Doctorate of Physical Therapy from the University of Nebraska Medical Center in Omaha. Lisa is a member of the American Physical Therapy Association.*



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elcome to the new off- season: Balanced Regeneration- an off-season training program that blends traditional sports conditioning methods and ideals with the progressive methods and concepts of Postural Restoration (PR) science. The objective of the Balanced Regeneration series is to create balanced athletes participating in side dominate sports. A side dominate sport is defined as a sport in which skills are performed utilizing a “preferred” side of the body on a repeated basis. The seven articles preceding this one have introduced the science of PR and explained how to specifically apply it in an actual week by week program. This final synopsis functions to review and summarize the biomechanical concepts and muscle training methods that were introduced in those seven articles as well as briefly discuss how an abbreviated form of Balanced Regeneration can be used during in-season training.

### The Problem-Anatomy of Imbalance

If the members of an athletic team were instructed to stand shoulder to shoulder in a straight line with their arms at their sides, it would appear that the pelvis and trunk of all players was neutral, facing straight ahead. Despite appearances, the pelvis may not be in a neutral resting position in several of those athletes. Most competitive athletes, dealing with chronic pain/recurrent injury, that are evaluated with Postural Restoration methodology initially present with significant left side versus right side differences; differences in bony position, differences in muscle strength/function, and differences in the integrity of various joint sockets. Asymmetrical sports demands coupled with uncontrolled right side dominance can produce these postural imbalances. The most common postural presentation is left pelvic torsion with compensation via the trunk and upper extremities. The most common functional strength impairment is inability to achieve AFIR on the left hemi-pelvis and AFER on the right hemi pelvis during upright activity.

Acetabular (socket) Femoral (ball) Internal Rotation (AF IR) and Acetabular Femoral External Rotation (AF ER) are terms the Postural Restoration Institute has coined as an individual’s ability to correctly

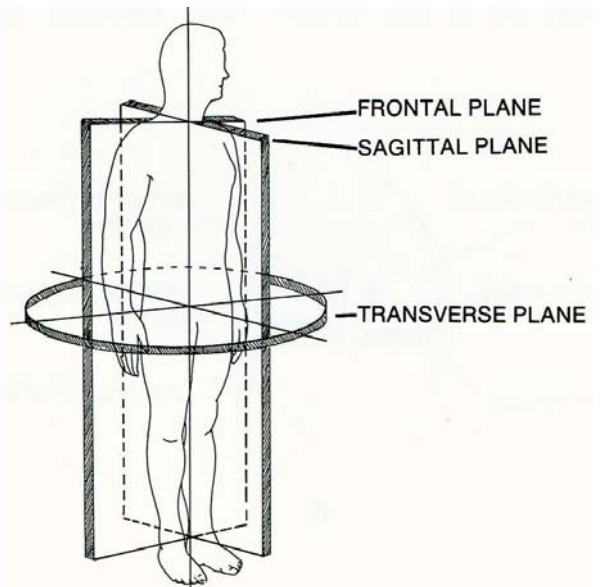


Figure 1

shift into and out of their hips. AFIR and AFER are basically myokinematic descriptors of gait. Myokinematics is the study of muscle function and force in the three cardinal planes of the body; sagittal, frontal, and transverse (Figure 1). Most muscles function in at least 2 if not all 3 planes because of their oblique orientation between their bony attachments. AFIR and AFER can be thought of as both a bony position and a triplanar muscle action. During swing and stance phases of gait both the femur and pelvis should be rotating on each other simultaneously. Some of this rotation is AFIR and some is AFER. Stance phase can be divided into two halves. The first half begins just after heel contact as the body's center of mass is moving forward, upward, and toward the foot that just contacted the ground. The body is essentially climbing and shifting its mass over the supporting lower extremity as the pelvis, femur, and tibia are all rotating internally in the horizontal plane. This is AFIR; the acetabulum is rotating internally over the femur (Figure 2). AFIR motion continues until midstance where the hemi pelvis is in a maximum amount of AFIR position. After midstance the pelvis, femur, and tibia reverse their direction and begin to externally rotate as the center of mass starts moving in a downward direction toward the other leg which is still in swing phase. External rotation occurs until toe off. This is AFER (Figure 3).

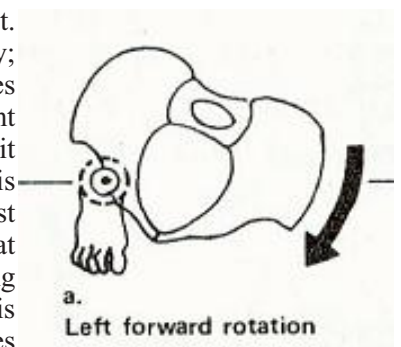


Figure 2

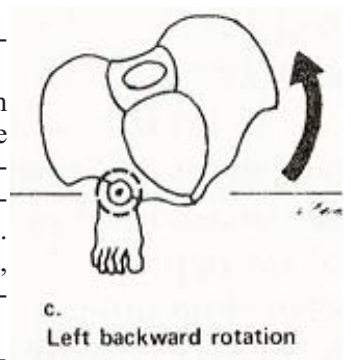


Figure 3

Athletes who have acquired a resting position of left pelvic torsion lose the ability to perform active AFIR on the left and active AFER on the right (Figure 4). The left hemi pelvis has become stuck anteriorly in the sagittal plane, abducted in the frontal plane, and externally rotated in the transverse plane. Left lumbo-pelvic musculature, such as the hamstrings, left gluteus medius, and left ischio-condylar adductor, have lost their optimal mechanical advantage/leverage to correctly function. The reverse is true on the right. The right hemi pelvis has become stuck internally rotated, adducted, and posteriorly rotated. Right lumbo-pelvic musculature such as the gluteus maximus has lost its optimal mechanical leverage to correctly function as the primary hip extensor/hip external rotator.

**The Solution- Conditioning** programs need to have a built in counter mechanism that significantly reduces an athlete's tendency towards left pelvic torsion. The solution is to asymmetrically train and isolate musculature that restores AFIR ability to the left hemi pelvis, and AFER ability to the right hemi pelvis. The important concept to review is the likelihood of altered muscle function with changed bony position. The potential of a muscle to generate force across a joint in a given plane of motion depends upon its position and length. Paired muscles of the body may have significant differences in levels of strength, tone, and endurance relative to one another if bony position has altered the position and length of one of them. The previous article provided a week by week schematic that details when to initiate which exercises and in what order.

The initial training focus emphasizes posterior pelvic rotation, i.e. sagittal repositioning, via hamstring facilitation. You will automatically begin to influence other key muscles groups in other planes of motion as you recruit the hamstrings. Most people don't think of the hamstrings as "core stabilizing muscles", but actually they are the longest and could be argued the most influential core stability muscles we have. They need to be short and tight enough to be able to oppose or counteract all the muscles that have anterior rotation force/leverage on the pelvis, such as the back extensors and hip flexors, which tend to be very strong on most athletes. They also need to be short and tight enough to oppose excessive anterior translation force of the tibia (lower leg) during jumping activities. Left hamstrings reduce a left pelvic torsion by rotating the left hemi pelvis posterior so that both hip sockets (acetabulum's) are oriented at the correct angle and direction.

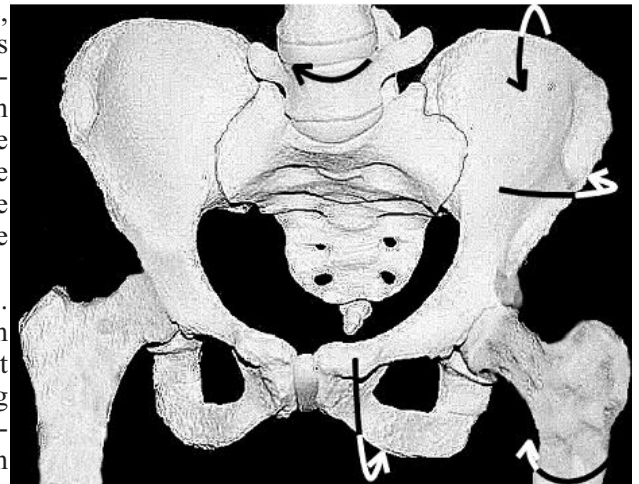



Figure 4

The next step is to begin recruiting/retraining the left ischio-condylar adductor and the right glut max. The ischio condylar adductor functions to pull and seat the femoral head into the hip socket. This adductor also promotes optimal patella femoral tracking by keeping the femur correctly oriented under the knee cap. The right glut max functions to produce the primary hip extension/hip external rotation torque needed to push the body weight from midstance to toe off.

Following left adductor and right glut max facilitation you begin retraining the left gluteus medius to enable restoration of the ischio-condylar adductor/gluteus medius force couple. This force couple must be active from left heel strike to left midstance otherwise achieving a position of left AFIR is impossible. These initial 4 steps in the Balanced Regeneration program lay the ground work in preparing athletes for progression to upright dynamic single leg activity. The side lying, back lying, prone lying positional exercises that were presented and explained serve two purposes; first they restore optimal resting position of the pelvis, and second they introduce correct muscle facilitation for AFIR and AFER without anti-gravity demands. You will then implement maintaining a position of AFIR during left single leg activity and a position of AFER during right single leg activity. It is the single leg squatting activities that build strength and proprioceptive awareness needed to carry over and reproduce the demands of the athlete's sport. You may have noticed an omission of abdominal discussion and integration as well as upper extremity training. With many of the techniques presented in this series, the abdominals will naturally activate with the hip musculature. However, the biomechanics of the abdominals, and specific abdominal integration would be appropriate topics for a second edition Balanced Regeneration program.

We could also incorporate a shoulder program.

Initially, implementing Balanced Regeneration with your accustomed conditioning and resistance training methods will be somewhat time consuming. As you familiarize yourself with the techniques the process will become more efficient and will streamline nicely into your scheduled workouts. By the time you have completed your new off-season training program, you will likely be formulating ideas as to how to continue with these techniques during the in-season workouts. Once you understand the order and progression of the exercises, and you have a group of athletes that are familiar with the techniques, there are various combinations of exercises that you can use. For in-season conditioning programs, my general suggestion to the strength coaches I work with is to choose one or two repositioning exercises for a warm-up and continue the single leg squat activities in between traditional resistance training activities. On different days use different repositioning exercises. Another option is to modify a given technique you are already familiar with. For example, I recently consulted with a strength coach and his volleyball athletes on how they were performing Bulgarian single leg squats; we modified the technique by adding a hip shift first so the athletes were consciously aware of squatting with the quads, gluts, and adductors all co-activated.

In summary, Balanced Regeneration gives coaches a way to challenge and control the right sided dominance that is present in all athletes, even those who are left handed. It provides specific step by step plan of how to integrate Postural Restoration (PR) techniques into an off-season conditioning program while allowing for autonomy. The plan can be modified based on the amount of time available, the size of group, and the type of athletes the coach is working with. The techniques should also be used for in-season maintenance. Remember, off-season training is the time to correct and restore optimal alignment and muscle mechanics. During in-season, when your athletes are continually stressed by the repetitive nature of their sport, you continue to implement the PR techniques to control and prevent the development of muscle imbalance. Thus the Balanced Regeneration program should become cyclic; it will restore athletes in the off-season, and regulate athletes throughout the competitive season. 

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For more information and references, please visit [www.posturalrestoration.com](http://www.posturalrestoration.com).  
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