Pilates for
The Crossfit Athlete with
Flat Back Posture

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Abstract

Crossfit was founded by former gymnast, Greg Glassman and his former wife, Lauren Jenai. The first affiliated gym opened in 1995 in Santa Cruz, CA. Crossfit is a strength and conditioning fitness program which helps athletes train for optimal physical competence in 10 physical areas or skills (cardiovascular endurance, stamina, flexibility, strength, power, speed, coordination, agility, balance and accuracy). Today, there are over 13,000 affiliate gyms around the world with over half in the United States. Crossfit can be broken down into 3 basic compartments of cardiovascular endurance, gymnastic exercises and Olympic weightlifting. Often, crossfit athletes are lacking balance in their muscles due to the highly repetitious nature of their sport. This can result in injury if the body isn’t balanced properly. A balanced body will perform more efficiently when it’s muscles are working together in synergy, equal in flexibility and strength.

A Pilates conditioning program, under the BASI block system can be incorporated as an excellent complementary tool to any crossfitter to maintain proper alignment, lengthen the muscles and work the entire body to create balance and awareness. Ultimately, adding longevity to athletes’ ability to perform with more weight, quicker and with the agility that is demanded from these athletes.
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Anatomy

A neutral spine refers to “three natural curves” present in a healthy spine. Webster’s New World Medical Dictionary defines neutral posture as the stance that is attained “when the joints are not bent and the spine is aligned and not twisted.” Good alignment translates into less stress on the spine and more economical muscular activity. The natural curves in the spine act as shock absorbers to protect the body.

What is flat back syndrome? It is an abnormal condition where the spine loses its natural low back curve in the lumbar spine and becomes flat. The spine becomes imbalanced and the patient leans forward to compensate. Patients with flat back syndrome typically notice troubles standing upright or have ongoing back or leg pain.
and fatigue. This typically causes the head to push forward as well.

The pelvis is considered the bridge between the upper and lower body. The alignment of the pelvis will affect the body above it and below it. Neutral pelvis is when the ASIS (Anterior Superior Iliac Spine) and the PS (Pubic Symphysis) are in the same plane. The placement of the pelvis will affect the efficiency of the movement and if misaligned, can cause pain and possible injury. Balanced muscle groups of the pelvic complex are fundamental to striving for ideal posture and function. The four areas that I focused on with my client are the abdominal group (Rectus Abdominis, External Obliques, Internal Obliques, Tranverse Abdominis), the back extensors (Erector Spinae group, Deep Posterior Spinal Group, Multifidus, Quadratus Lumborum), the hip flexors (Psoas major, Iliacus, Rectus Femoris, Sartorius) and the hip extensors (Gluteus Maximus, Gluteus Medius, Semitendinosus, Semimembranosus, Bicep Femoris).

Within the crossfit community, athletes typically have a difficult time maintaining the neutral pelvis and stabilizing the lumbar spine, especially while under heavy load. This can be addressed using the BASI block system to ensure stability in lumbar region.
Abdominal group

- Transversus Abdominis
- The Rectus Abdominis
- Internal Oblique
- External Oblique

Abdominal group
Back Extensor Group

Deep Extensors

- Rotators (not shown)
- Semispinalis
- Multifidous

Superficial Extensors (Erector Spinae)

- Iliocostalis
- Spinalis
- Longissimus

Not Shown: Interspinales Splenius

Intertransversarii

Quadratus Lumborum

Adapted from Gray’s Anatomy
Hip Flexor Group

12th rib
Iliac crest
Psoas major
Iliacus
Anterior superior iliac spine
Sartorius
Rectus femoris
Vastus lateralis
Vastus medialis
Patella
Patellar ligament
12th thoracic vertebra
5th lumbar vertebra
Adductor group

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Muscles of the leg (posterior view)

Gluteus medius
Gluteus maximus
Adductor magnus
Gracilis
Biceps femoris
Semitendinosus
Semimembranosus

Hamstrings

Hip Extensor Group
Introduction

Crossfit athletes are a specific population who train their bodies to be ready for anything. The overall goal of Crossfit has been to forge a broad, general, and inclusive fitness program to prepare athletes for the known and the unknowable. Put simply, it is the “sport of fitness.”

WOD’s (workout of the day) are measured either by time, reps, or weight. It can be an intense, quick and explosive workout, or slow and methodical, depending on the goals of the day. WOD’s are constantly changing between metabolic, strength and gymnastics and adhering to the 10 basic principles of crossfit. (Cardiovascular endurance, stamina, flexibility, strength, power, speed, coordination, agility, balance, accuracy).

Pilates has ten basic principles as well; awareness, balance, breath, concentration, center, control, efficiency, flow, precision, and harmony. Executing these principles helps guide the athletes into a balanced, healthy, body and mind that only BASI offers with the block system.
Body

My client, Beth Watson is a 51 year old female. She has been an avid crossfit athlete since 2012 and attends 5-6 classes per week of crossfit. She also is a recreational runner and attends 1 pilates mat class per week for the past 3 years.

Beth has flat back syndrome and difficulty stabilizing the pelvic lumbar region of her spine. She tends to work in a posterior tilt by default of her flat back. Beth has a touch of scoliosis which makes her right leg significantly longer than her left, causing her right hip to hike up. She suffers from pain in her left leg from her adductor and hamstring being too tight as well as weakness in gluteals, hamstrings and hip flexors.

Beth has difficulty finding her neutral pelvis and maintaining the strength to hold her pelvic lumbar region stable when performing certain exercises in Crossfit. We have focused on her deadlift to help give measure to her improvement under the BASI block system. The deadlift is an exercise which uses primarily the gluteus maximus and hamstring to extend the weight off the floor. Erector spinae work to keep bar stable and keep back from rounding. The quadriceps work to extend the knee and the adductor magnus works to stabilize the leg.

“The Deadlift keeps company with standing, running, jumping, and throwing for functionality but imparts quick and prominent athletic advantage like no other exercise.”

Beth bias’ is to a posterior tilt which causes pulling and pain in lower lumber spine.
Beth has had an open mind with every session. She has continued her mat class once a week and added in private sessions including the reformer, cadillac (tower) and step barrel once a week for 30 weeks.
**Body Conditioning Program** - BASI block system

The following is the program I used for Beth while keeping in mind her goals to increase her deadlift weight and maintain her lumbar stability. We did an initial postural analysis, basic overview of Basi Pilates foundations and 10 principles, proper breathing and basics of neutral pelvis and neutral spine.

**Warm Up**

Session 1-10: Mat-Roll down, pelvic curl, spine twist supine, leg changes, chest lift, chest lift with rotation.

Session 11-21: Mat-Roll down, pelvic curl, spine twist supine, leg changes, chest lift, chest lift with rotation, double leg stretch, single leg stretch, criss cross.

Session 21-30: Mat- Roll down, pelvic curl, spine twist supine, leg changes, roll up, double leg stretch, single leg stretch, criss cross. Cadillac: Roll up with RU bar, mini roll up, mini roll up with obliques.

**Footwork**

Session 1-10: Reformer

Session 11-20: Reformer & Cadillac

Session 21-30: Reformer & Cadillac

**Abdominal Work**

Session 1-10: Reformer- Hundred Prep, Hundred, Coordination

Session 11-20: Reformer-Hundred, Double Leg in Straps, Double leg in straps with rotation, Short Box Series

Step Barrel-Chest lift, Reach, Overhead Stretch, Teaser Prep
Session 21-30: Reformer-Hundred, Double Leg in straps, Double Leg in Straps with rotation, Coordination

Cadillac-Roll Up top loaded, Roll Up bottom loaded, Teaser 1

**Hip Work**

Session 1-10: Reformer-Supine Leg Series, Frog, Circle (down/up), Openings

Session 11-20: Reformer-Circles(down/up), Extended Frog, Extended Frog Reverse.

Cadillac-Frog, Circles (Down/Up), Walking, Bicycles.

Session 21-30: Cadillac-Frog Single Leg Supine Series, Circles (Down/Up), Hip Extension, Bicycle

Step Barrel: Supine Leg Series

**Spinal Articulation**

Session 1-10:  Reformer-Bottom Lift, Bottom lift with extension

Session 11-20: Reformer-Short Spine, Long Spine, Cadillac-Monkey Original


**Stretches**

Session 1-10: Reformer-Standing lunge

Session 11-20: Reformer -Kneeling lunge, Side Split

Session 21-30: Standing lunge,  Step Barrel: Shoulder Stretch Lying Side

**Full Body Integration**

Session 1-10: Nothing

Session 11-20: Scooter, Upstretch 1, 2, 3, Elephant

Session 21-30: Roundback, Flat back, Reverse Knee Stretch, Down Stretch
Arm Work

Session 1-10: Arm Supine Series

Session 11-20: Arm Supine Series, Arm Sitting series

Session 21-30: Arm Kneeling series, Shoulder push, Shoulder push single arm

Full Body Integration

Session 1-10: Nothing

Session 11-20: Nothing

Session 21-30: Long Back Stretch, Balance Control Front

Leg Work

Session 1-10: Reformer: Hamstring Curl

Session 11-21: Reformer: Single Leg Skating

Session 21-30 Reformer: Hamstring Curl

Lateral Flexion/Rotation

Session 1-10: Step Barrel: Side Lift, Mermaid

Session 11-20: Reformer: Side Over Box Cadillac: Butterfly

Session 21-30: Reformer: Side Over Box with Ball, Mermaid

Back Extension

Session 1-10: Reformer: Breastroke Prep, Breastroke,

Session 11-20: Step Barrel: Swan Prep, Swan

Session 21-30: Reformer: Pulling Straps 1 & 2

The exercises chosen were to help my client improve her pelvic stability while giving her freedom in her hip to move. We focused on her footwork to align the hips, knees and feet. The footwork helped to focus on the pelvic twisting and hiking of hip as
well. We strengthened her abdominal muscles, and hip flexors with the abdominal block. We focused on her adductors and hip extensors in the hip block as well as in the spinal articulation. We stretched her hip flexors and hamstrings trying to loosen up her tight hamstring on the reformer but the barrel proved to help her immensely in the shoulder stretch lying side, as well as just lying on the barrel to open up her back. We started the full body integration after 10 sessions and they all helped her to strengthen the four areas we were focusing on. Arm work also proved to help strengthen her back extensors to move her arms. Leg work was invaluable for Beth, really helping her engage and isolate her hamstrings while lengthening the hip flexors. The lateral flexion block helped Beth to strengthen both side of her obliques evenly, helping her twist in her thoracic spine and opening up her obliques. The back extensions were an eye opener for Beth as well, helping her to really learn to articulate through her spine and engage and strengthen her back extensor muscles. Overall, this full body block system has helped Beth to not only improve her power in her deadlift with proper form but also her posture and gait. Overall, incorporating pilates conditioning program has helped to increase her power in her weightlifting but also in her gymnastics too. Beth also was able to do kipping pull ups because of her increased strength and awareness. Exciting!
Conclusion

In this case study, my client Beth, is challenged with her flat back syndrome and slight scoliosis. She biased towards posterior tilt which compromised her lower back, leading to pain and injury. Her goal was to perform her deadlift without rounding her lower back while increasing her weight, without pain.

The body conditioning program utilized 4 pieces of apparatus, the reformer, cadillac (tower), step barrel and mat. Our objective was to strengthen the four areas that connect the pelvis and bridge between the upper body and lower body. (The abdominal group, back extensor group, hip flexors and hip extensors).

Beth really improved the overall balance of her body, helping her flexibility, improving her strength, (her deadlift was 160lbs and increased to 185lbs over the course of our sessions, (without pain) and most importantly stabilizing her lumbar pelvis region. Integrating the pilates programming into the crossfit world has been exciting. They balance one another beautifully!
Bibliography

Books


Websites


