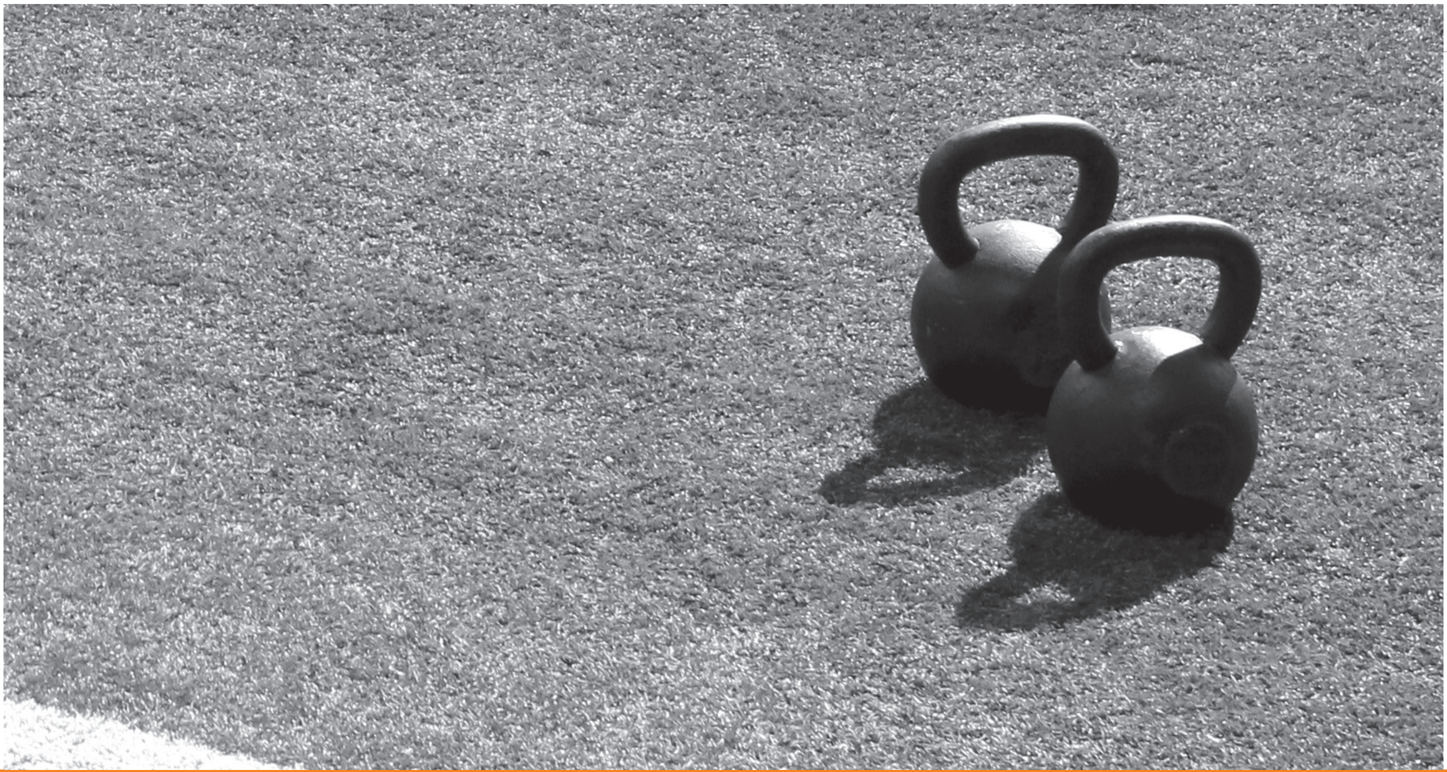

CZECH GET-UP

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Around the same time that kettlebell training was rising in popularity in the United States, Pavel Kolar, a physiotherapist with a Doctorate degree in Pediatrics, was formulating his approach to rehabilitation in the Czech Republic at the Prague School of Rehabilitation (2). Kolar comes from a long line of world-leading clinicians and physiotherapists in the medical and rehabilitation profession. Combining the influence of physicians like Vladimir Janda, Karl Lewit, and Vaclav Vojta with his experience as an elite gymnast, Kolar formulated a comprehensive explanation of movement and function, which formed the basis of Dynamic Neuromuscular Stabilization (DNS). This article will examine the key concepts of this approach and its utility in the field of strength and conditioning. The Czech get-up uses positions consistent with the principles of DNS and developmental kinesiology (DK)—the neurophysiological aspects of the maturing locomotor system (2). By using a kettlebell during the Czech get-up, resistance is provided against the movement patterns seen in the DNS exercises and in DK. This enables the Czech get-up to activate and train ideal stabilization strategies and efficiency of movement, which is the primary goal of DNS (2,3).

KEY CONCEPTS OF KOLAR'S APPROACH

Some of the key concepts and principles of Kolar's DNS approach are DK and the integrated spinal stabilization system (ISSS). Kolar's explanation of the ISSS appreciates the complexity of movement and demonstrates how the entire body works together to stabilize and move (2). While the entire body contributes to stabilization of the spine, at the core of ISSS are the diaphragm, pelvic floor, the entire abdominal wall, and the short intersegmental spinal musculature (i.e., multifidus lumborum) (1,2). These structures work together to generate pressure within the abdomen (i.e., intra-abdominal pressure [IAP]), which balances with the spinal extensors to maintain the spine in a stable and elongated position necessary for optimal function (2). A critical event in the stabilization process is concentric contraction of the diaphragm, during which time, the central tendon of the diaphragm descends towards the pelvis. This action pushes the contents of the abdomen downward and outward, eccentrically activating the entire circumference of the abdominal wall and the pelvic floor (4). These structures all work together to generate and regulate IAP to meet the demands of whatever task the athlete is performing (2). Whether picking up a pencil or deadlifting 1,000 lb, the movement is anchored by IAP.

In addition to emphasizing the role the diaphragm plays in stabilization, DNS is built upon the scientific principles of DK. During development, the child is maturing physically, emotionally and neurologically. Much of this development occurs in the first 15 months of life (2). At this time, the child acquires the ability to achieve certain positions (e.g., triple flexion, quadruped, squat, etc.) and to execute certain movements such as turning, crawling, standing, and walking without having to be taught (2). These movements are fundamental and later become the foundation for more complex movements such as throwing or sprinting.

After studying DK and observing how healthy babies and children move, Kolar proposed the DNS concept of joint centration. The concept of joint centration is a dynamic phenomenon whereby the locomotor system maintains optimal joint positioning throughout the entire movement (2,3,4). Such positioning uses the maximal available interosseous contact (i.e., the connection between bones) for optimal load transfer (3). This requires, and promotes, balanced co-activation of all the muscles surrounding the joint. Joint centration is a systemic phenomenon and it requires integration of the entire body to maintain proper positioning throughout the movement. Poor positioning, or decentration, of one joint will affect the centration of all other joints in the body (e.g., excessive pronation of the foot may prohibit positioning of the spine and pelvis, which itself affects positioning of the shoulder) (2). Joint centration provides efficient and balanced distribution of the forces transmitted through the joint. This simultaneously protects the passive structures and enables the joint to transfer more force, which may lead to decreased risk of injury and improved performance (2,3,4). Figures 1 and 2 depict the muscle actions involved for centration and decentration, respectively.

To restore ideal movement and joint centration within his patients, Kolar constructed a rehabilitation system utilizing the positions and movements observed during development (2). These exercises are based on DK and may be useful for two main reasons. First, the exercises train the ISSS because the movements emphasize integration of the entire locomotor system into the stabilization process, which enables the exercises to more effectively train the athlete to achieve joint centration. Second, the exercises use positions familiar to the central nervous system, allowing them to more easily (re)activate proper movement strategies necessary for optimal function and performance. The following sections provide specific DNS active exercises which mimic the positions seen during development using the Czech get-up.

LANDMARK POSITIONS IN CHILDHOOD DEVELOPMENT

Below are some examples of landmark positions in development that are commonly utilized in DNS:

ISSS DEVELOPMENT

Figure 3 depicts a child at four months of development. This is typically when a child begins to integrate the diaphragm with the abdominal wall and pelvic floor to generate pressure within the abdomen (2,3). This is a particularly important position because the ability to generate and regulate pressure within the abdomen is a prerequisite for all movements, no matter how small. This is a common position used in rehab and training to improve an athlete's ability to generate pressure within the abdomen properly for more complex movements such as the squat, lunge, and bench press. (Figure 3 – ISSS Development – 4 Months Supine Position)

TURNING PATTERN

Figure 4 shows a child turning from his back to his belly, a movement typically acquired around six months of development (2,3). This movement is built upon the ability to generate pressure within the abdomen and is when the child starts to activate their anterior and posterior abdominal oblique slings. The oblique slings are necessary for virtually all movement, but are particularly important for turning motions like throwing a discus or hitting a tennis ball. (Figure 4 – Turning Pattern – 5 Months Side-Lying Position)

TRIPOD POSITION

Figure 5 portrays a child in the tripod position, which is typically achieved between 9 and 11 months of development (2). This is an important position because it is the first time the child is able to partially support their weight using a flat foot. This is a transitional position where the child changes from a turning pattern where the upper body and lower body supporting segments are on the same side (i.e., ipsilateral pattern) to a crawling pattern where the upper body supporting segment is contralateral to the supporting segment in the lower extremity (i.e., contralateral pattern) (3). This is where the child begins to become more stable in preparation for reaching, standing, and eventually walking. (Figure 5 – Tripod Position)

KEY PRINCIPLES FOR PERFORMING THE CZECH GET-UP

The following are three key principles to use while performing the Czech get-up:

1. The coordination of stabilization and respiratory function of the diaphragm must be maintained throughout the entire Czech get-up sequence.
2. Use only enough weight that allows for the ideal quality of dynamic stabilization and joint centration throughout the entire movement.
3. The purpose of the Czech get-up is to improve the athlete's ability to maintain joint centration throughout the entire movement.

CZECH GET-UP POSITIONS

POSITION 1 (STARTING POSITION) (FIGURE 6)

The starting position begins with the athlete on their side, holding the kettlebell with both hands. This position is not seen in development, but is necessary to safely transfer the kettlebell to the initial supine position. The athlete should keep the kettlebell close to the chest while rotating into the next position to ensure safety.

POSITION 2 (8 WEEKS SUPINE POSITION) (FIGURE 7)

Keeping the kettlebell close to the chest, the athlete will turn from the side to a supine position. Using both hands, the athlete should press the kettlebell up to a position directly over one shoulder. The elbow should be in slight semi-flexion and the kettlebell should be supported within the slightly opened hand with the wrist in slight radial flexion and abduction of the metacarpals. This arm and hand position should be maintained through the Czech get-up sequence. In this position, the athlete establishes sagittal stabilization with the hips flexed at about 45 degrees the knees flexed to 90 degrees and the ankles dorsiflexed. The athlete will have their head, shoulder blades, feet, and lumbar-sacral junction as a base of support on the ground. This position is consistent with a child who is less than three month of development.

POSITION 3 (3 MONTHS SUPINE POSITION / TRIPLE FLEXED POSITION) (FIGURE 8)

The athlete should use ISSS to activate the abdomen to generate sufficient IAP and sagittal stabilization. Once the abdomen has been pressurized, the athlete should flex the hips to 90 – 110 degrees without any movement of the spine or lower legs. This will bring the athlete into a triple flexed position, consistent with a child at about three months of development. The athlete should continue to pressurize the abdomen to slowly lift their pelvis off the floor without moving the hips or legs while shifting their support onto the thoracolumbar junction. This position is commonly attainable when a child reaches four month of development. Throughout the entire transition, the diaphragm and pelvic floor maintain a parallel relationship and coordination between respiration and stabilization (1).

POSITION 4 (5 MONTHS SIDE-LYING POSITION / PARTIAL TURNING) (FIGURE 9)

From the supine position, the athlete should initiate the turning process by providing a base of support with the arm and hip not holding the kettlebell. Throughout this transition, the athlete should maintain a parallel relationship between the diaphragm and pelvic floor. Meanwhile, the contralateral hip from the kettlebell should abduct, externally rotate, and extend slightly in preparation for support. This position is consistent with a child at between four and six months of development. Full turning from supine to prone is typically achieved by six months of development.

POSITION 5 (LOW OBLIQUE SIT) (FIGURE 10)

The athlete should continue the turning process until they are supported on their elbow. This position is called the low oblique sit and is consistent with a child at about seven months of development, before reaching the tripod position. In this position, the elbow is directly beneath the shoulder and the athlete is supported by the hip and elbow. The supporting hip and knee should be partially flexed and other hip and knee should be flexed with the foot flat on the ground.

POSITION 6 (HIGH OBLIQUE SIT) (FIGURE 11)

Next, the athlete will push up off of the elbow until supported on an open hand with the elbow extended. In this transition, the legs do not move much and the support is maintained on the gluteus medius and hip. This position is called the high oblique sit and is typically acquired at eight months of development.

POSITION 7 (TRIPOD POSITION) (FIGURE 12)

The athlete should then transition from the high oblique sit to a tripod position. This will involve shifting the weight from the supporting hip down the thigh and onto the lateral portion of the knee. As the support shifts distally, the supporting hip should abduct, extend, and externally rotate to lift the pelvis off of the ground. At the same moment, the top leg should step forward to attain the tripod position. This position is typically acquired at 9 – 11 months of development. In this position, the athlete is supporting their weight with their knee, foot, and open hand. The entire foot should be loaded with equal pressure on the heel, the first metatarsophalangeal joint, and the fifth metatarsophalangeal joint, which helps control the position of the knee and is necessary for optimal pelvic positioning. The foot and hand should have equal weight distribution. It is critical to provide support with well centrated peripheral segments.

POSITION 8 (HIGH KNEELING POSITION) (FIGURE 13)

The athlete should then move up into a high kneeling position where they are supported only by their knee and foot. Proper loading of the foot must be achieved in this position before the athlete progresses. High kneeling is a position typically acquired by 10 months of development.

POSITION 9 (STANDING POSITION) (FIGURE 14)

From the high kneeling position, the athlete should progress to a standing position. Throughout the transition from high kneeling to standing, joint centration and ideal stabilization should be maintained. Standing in free space is not typically achieved until a child reaches 12 – 14 months of development.

POSITION 10 (SQUAT POSITION) (FIGURE 15)

From the standing position, the athlete should lower into a squat position where they can maintain shoulder joint centration with ideal stabilization throughout the spine. Many athletes struggle with this movement because they lack one of the many requirements (e.g., thoracic extension range of motion [ROM], hip mobility, or lumbopelvic stability) necessary to achieve the position. The athlete should only descend to a depth where they can maintain the quality of the movement. The squat position is typically acquired after 10 – 12 months of development. From the squat position, the athlete should then stand back up and reverse the motion, going back into the initial starting position.

CONCLUSION

Demonstrating command and control over each position and the transitions from each position is the goal of the entire movement. It is important for athletes and strength and conditioning professionals to remember that DNS emphasizes quality of movement over speed, strength, or quantity of movement.

ACKNOWLEDGEMENTS

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For more information on how to perform the Czech get-up, a sample video can be accessed by visiting https://www.youtube.com/watch?v=tXplxBb1nZE.

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ABOUT THE AUTHORS

Michael Rintala is in private practice in San Diego, CA specializing in sports medicine and rehabilitation. He graduated with a Doctor of Chiropractic degree from the Los Angeles College of Chiropractic in 1997. Rintala has been part of the Professional Golf Association (PGA) Tour Sports Medicine Team since 2005. He is also a treating doctor for the World Surf League (WSL) and wide variety of other organizations ranging from dance to action sports. Rintala is an international instructor on Dynamic Neuromuscular Stabilization (DNS) for the Prague School of Rehabilitation. He is a Hardstyle Kettlebell Certified practitioner and a certified DNS Exercise Trainer (DNSET).

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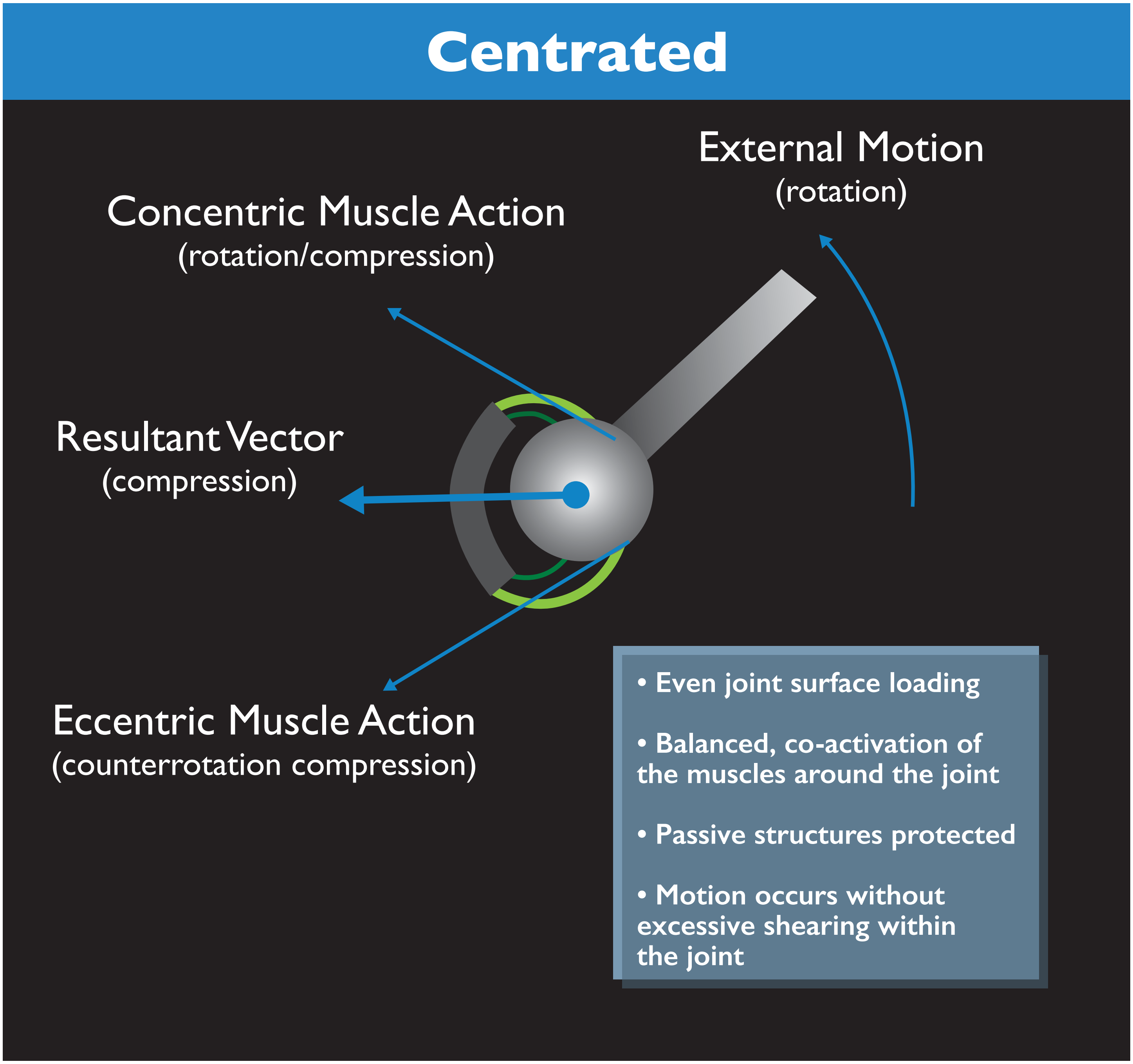

FIGURE 1. CENTRATED

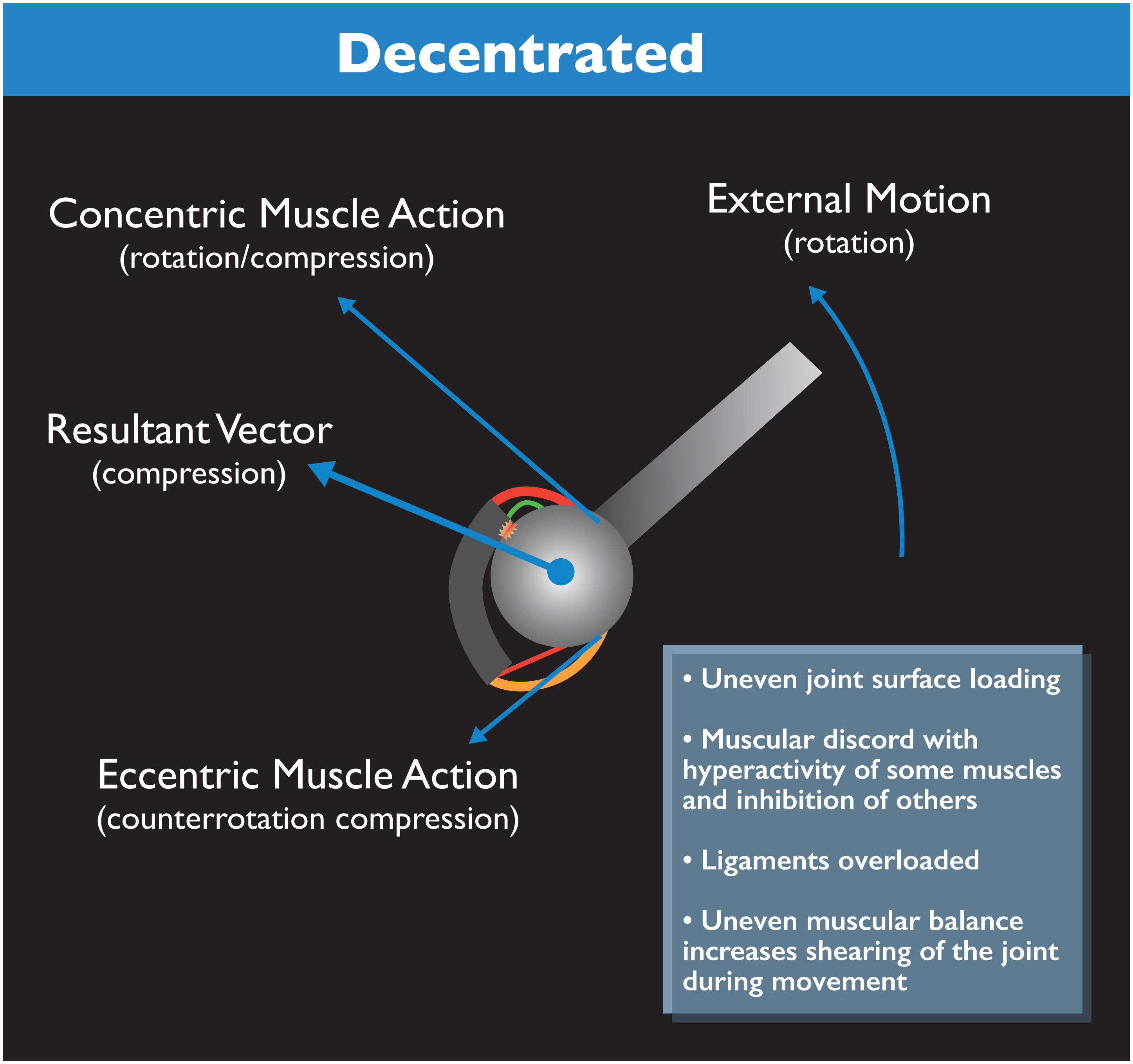

FIGURE 2. DECENTRATED

FIGURE 3. ISSS DEVELOPMENT – 4 MONTHS SUPINE POSITION

FIGURE 4. TURNING PATTERN – 5 MONTHS SIDE-LYING POSITION

FIGURE 5. TRIPOD POSITION

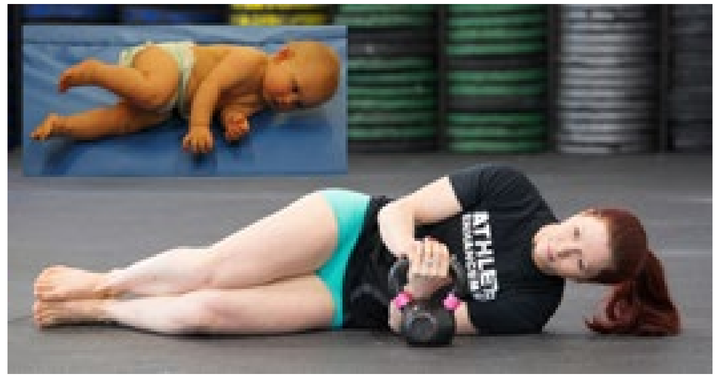

FIGURE 6. POSITION 1 – STARTING POSITION

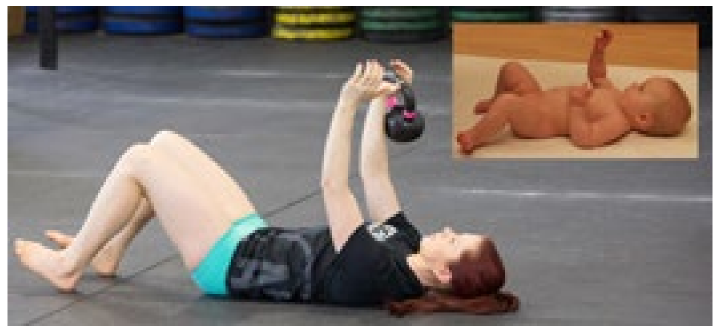

FIGURE 7. POSITION 2 – 8 WEEKS SUPINE POSITION

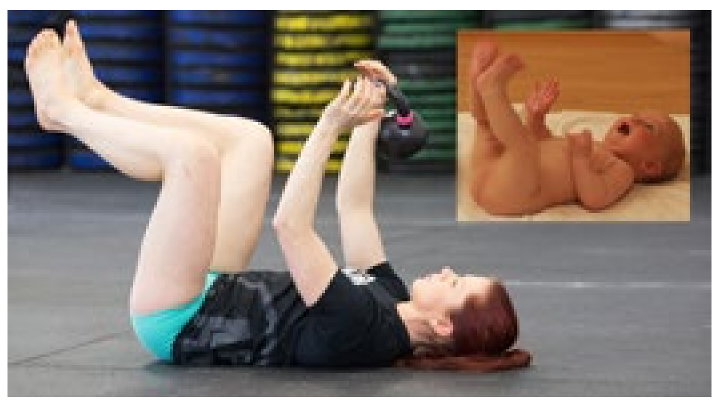

FIGURE 8. POSITION 3 – 3 MONTHS SUPINE POSITION / TRIPLE FLEXED POSITION

FIGURE 9. POSITION 4 – 5 MONTHS SIDE-LYING POSITION / PARTIAL TURNING

FIGURE 10. POSITION 5 – LOW OBLIQUE SIT

FIGURE 11. POSITION 6 – HIGH OBLIQUE SIT

FIGURE 12. POSITION 7 – TRIPOD POSITION

FIGURE 13. POSITION 8 – HIGH KNEELING POSITION

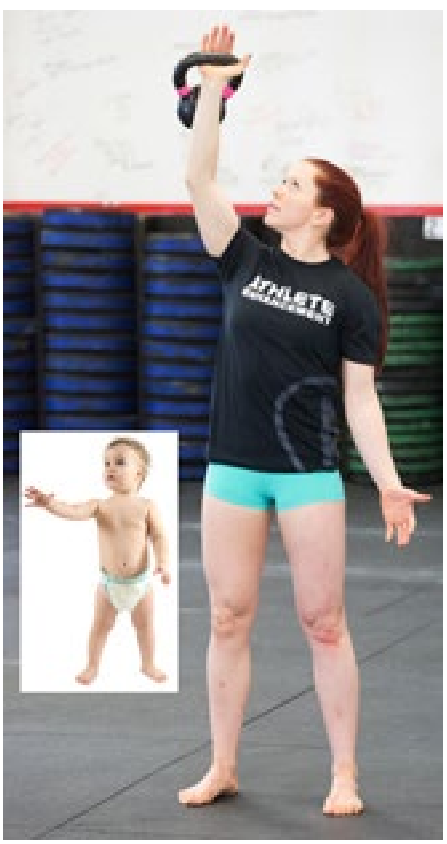

FIGURE 14. POSITION 9 – STANDING POSITION

FIGURE 15. POSITION 10 – SQUAT POSITION