



FUNCTIONAL TRAINING

This manual is your guide for taking your training to the next level, incorporating functional training methods for you and your client to improve performance and maximise results.

This manual will supplement your skill-based knowledge and build further upon the functional training methods outlined in the Iron Edge Functional Training workshop. The manual delves deep into functional training concepts and provides a reference useful to coaches and personal trainers in their pursuit of improved physical performance, whether it is for sports or daily living.

AIMS OF THE FUNCTIONAL TRAINING WORKSHOP AND MANUAL:

- To introduce and define the concept of functional training, including the benefits and the target population
- Outline the functional anatomy systems and planes of motion associated with functional training
- Provide basic screening protocol objectives and particular methods of how to screen clients and athletes for functional training
- Introduce single-leg training and the difference between supported and unsupported exercises
- Demonstrate how functional training relates to human movement, the role of specific functional training prescription and the best methods of implementing functional training to improve movement
- Outlining how to incorporate functional training methods into the existing training program, and how retention of human movement can occur through trained chunking and training techniques
- How to incorporate functional training into the training program

SAFETY PRECAUTIONS

Safety should always be the first priority when teaching lifting techniques. To enhance safety and reduce risk of injury, ensure the following points are met:

1. Always ensure you have sufficient room for performing various lifts, away from any hazards or obstacles.
2. Always ensure close supervision of all lifts, especially for beginners. When technique breaks down in any exercise, stop the exercise to reduce injury risk.
3. Always begin with a bodyweight (or use a dowel) to teach movement patterns and screen clients for appropriate range of motion, and ensure technique is sound before adding external load.
4. If pain occurs at any time - STOP the exercise and seek treatment.
5. Ensure breathing technique is learnt and executed before heavy lifting.



A person is shown from the waist up, performing a deadlift. They are wearing a dark t-shirt with "IRON EDGE" visible on the sleeve. They are holding a barbell with both hands, and their face shows intense effort. The background is dark and out of focus.

WHAT YOU WILL GAIN FROM THIS COURSE

As a trainer in the fitness industry, you have many other trainers competing for clients, jobs and positions. You also have a responsibility to those that you train that you provide the best possible service, and clients and athletes you work with expect you to help them not only achieve their individual goals but to do so in a safe manner.

This Iron Edge Functional Training workshop will provide you with extensive knowledge of functional training concepts, raising you above the competition in terms of training methods and the research background behind them. Having knowledge of functional training is one thing, but being able to fully understand it, explain it and then be able to safely prescribe and modify training based on its' methods will boost your reputation and skill set for a long and successful career in the industry.

This workshop and manual will provide you with this knowledge and teach you particular skills and techniques required to understand functional training as best as possible, and provide a foundation for performance training.

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INTRO TO FUNCTIONAL TRAINING

WHAT IS FUNCTIONAL TRAINING?

Functional Training involves training skills and motor patterns that relate closely to common human movement, with the aim to improve the ability to complete such movements. Basically, it involves training the body in the way that it was designed to move. It's underpinning philosophy is derived from performing everyday movements, that have been a staple of human behavior for hundreds of years. Squatting, lifting, pushing, pulling and rotational movements performed with feet on the ground comprise the majority of functional training movements.

ORIGINS OF FUNCTIONAL TRAINING

It's popularity has grown immensely in recent years and stems primarily from athletic conditioning in the sporting world, where athletes train their bodies specifically to their sport in order to improve performance. However its application is still in the infancy stages in some quarters, with people wrongly applying the term 'Functional Training' to their training programs⁵. Fundamentally, functional training should stress the body in methods and movements that are realistic, practical and purposeful to the individual. Therefore the concept of functional training revolves around the training of MOVEMENTS, not MUSCLES, and could equally be referred to as 'performance training'.

THEORY BEHIND FUNCTIONAL TRAINING

Linking the human body to move in a synergistic fashion engages more muscles, is more demanding on the neuromuscular system and allows for muscle co-ordination, as opposed to splitting the body into separate units and training them individually⁶. Integrating movement in this whole-body manner is another foundation of functional training, shifting away from the bodybuilding ideals of training muscles in isolation. The focus of functional training not only involves training the body to move more effectively and in a sequenced manner, whether in daily activities or in a sporting sense, but also to reduce injury risk through creating a unified neuromuscular system

where segments work in smooth association with one another.

A functional training program is often not focused on getting bigger biceps or a 6-pack, but improving the ability of the body to move effectively and in harmony to improve performance. The focus is on building strength in particular areas throughout movements that will assist the individual once they leave the gym.

Functional Training is organised and systematic in its training methods, designed to better prepare an individual or athlete for the physiological demands of their situation. Aspects and principles of functional training should be present and practiced throughout all training programs, and will be explained throughout the manual. If you are not incorporating functional training methods in your current training programs, you may be creating a detrimental scenario for yourself and your clients in terms of injury and functionality.

This manual will outline training particular movements involving action over a number of joints in a number of different planes of motion, aiming to develop fluidity in motion instead of developing great skill in one particular exercise. For example, having a strong, functional lower body means a client should be able to demonstrate strength over many lower-body movements. The inverse of this may be a client who has trained for years on the leg press machine and has the ability to press heavy loads, but once they are asked to perform a squat they are not only not able to replicate similar loads, but have an unstable core and cannot achieve sufficient depth. Therefore whilst they are highly skilled in the leg press and able to perform well, their strength is not functional as it does not translate to other movement.

The overriding notion of functional training is the inter-relationship of muscles and joints, and how they are not limited to one function or movement. Muscles can act as a stabiliser, a prime mover, a synergist muscle or an antagonist, whilst acting around a joint in different situations. Functional training aims to train in this manner, improving the ability of the neuromuscular system to perform a wide range of movements and skills that will ultimately assist in the performance of tasks^{6,7}.



INTRO TO FUNCTIONAL TRAINING

WHAT IS NOT FUNCTIONAL TRAINING?

Importantly, the functionality of training is dependent on the client and the context⁵. Therefore what may be functional for one person may not relate to the goals or needs of another person. In general population terms though, functional training does NOT involve isolating muscles and training movements to small range of motions or single plane activities. Generally, human movement tends to not be limited to single-joint movements that isolate a particular muscle group. This scenario may be more appropriate for injury rehabilitation, which will be discussed.

To demonstrate the common, traditional approach to training, consider the following scenario:

An untrained man walks into a gym for the first time. He plays football for his local club and is looking to improve his on-field performance, and his coach has suggested he should get stronger if he wants to make the senior team. Having never weight-trained before, he opts to follow the lead of other gym-goers who are working out. Throughout the session he completes machine chest flies, bicep curls, triceps pushdowns and lat pull-downs. He finishes with some crunches, then leaves.

Unfortunately, this is an all too common scenario seen in many commercial gyms. There is no programming or structure, and the exercises involve isolating individual muscle groups.

Most of the exercises were performed either on the floor or seated. None related to movements or joint angles common in football, and training this way will likely give rise to dysfunction.

Whilst following this program strictly will likely lead to muscle gains for a beginner, long-term adaptations will possibly promote injury, joint immobility and movement issues and a lack of strength in key areas. A noticeable absentee in the session was any focus on lower body or full body movements. As will be discussed throughout the manual, the source of human movement stems from our trunk and the power-generating capacity of the large muscle groups of our lower body, therefore inclusion of movements integrating these areas are critical when discussing functional training.

The above type of training is not considered 'functional', as it trains the body as separate identities and will likely isolate muscle and joint movement. Whilst that may be considered appropriate for bodybuilders and injured populations, the majority of people who spend time and money on training would be better off applying a functional attitude towards their training to maximise training efficiency. What good is it for an individual to have a great-looking, massive chest but lack the ability to safely lift a heavy couch when moving house, or reach down to pick their child up off the ground?

Whilst you are contemplating that, try and answer the following questions:

1. How often in daily movement does an individual sit on chair with bent legs and extend their knees against a heavy resistance, as they do in a seated leg extension?
2. Is there a sport that requires someone stand with a load in their hands and only move their lower arm to flex the elbow and bring the load towards their head, as the bicep curl involves?
3. Have you ever had to squat down on an unstable surface with one leg throughout the day, whilst holding load in your hands, as you might do in a loaded pistol squat on a Bosu ball?

Predictably, these movements are not common in daily life and therefore have little transfer to practical human movement patterns. Whilst isolating a muscle (or group of muscles) or joint, or training on an unstable surface, may be important in rehabilitation settings to improve strength following an injury it has little worth or contribution to linking the human body parts to successfully and efficiently perform a serviceable movement. Functional training moves away from these single-joint, muscle isolation exercises and aims to encompass universal movement in its training methods.

There is no debate that single-joint, isolation exercises will likely lead to increased strength and muscle hypertrophy, however that type of resistance training does not take into account synergistic muscles.

Complex, high-intensity, multi-joint movements stimulate a large anabolic hormonal response, and the heavier loads able to be lifted in functional movements will likely lead to hypertrophy across the entire muscular system due to the hormonal spike^{8, 9}. Therefore functional training could be viewed as much more efficient in its training methods, promoting stimulation across more muscles in less time¹⁰. The great benefit in functional training is that it leads to a balanced, symmetrical and coordinated muscular system, through connecting body segments and activation of the trunk to better relate to daily or sporting activities^{10, 11}.

Isolating muscle and joint movement also fails to train the sling systems in the body, this will be explained throughout the manual. Training in an isolated fashion neglects the effect that a concentric contraction of one muscle has on the fascia of another, whereas functional training aims to view the body as a whole and take into account sequenced movement 'down the chain' to eventually produce more efficient, practical movement. Anabolic hormones are also elevated to a lesser degree in isolation exercises, therefore adaptations in muscle strength or body composition may be compromised¹⁰.

INTRO TO FUNCTIONAL TRAINING

BENEFITS OF FUNCTIONAL TRAINING

The benefits of Functional Training are infinite, and will continue through the individual's lifetime and extend into activities well away from training in their daily tasks and jobs:

- Improved postural and spinal stability under various conditions
- Improved range of motion, dynamic stability and joint mobility
- Improved linkage of the kinetic chain (sequenced movement throughout the body) through enhanced relationship between musculoskeletal and nervous system
- Improved confidence in the ability to perform daily tasks
- Reduced injury risk and increased injury prevention measures
- Ability to train a variety of training elements (Strength/Power/Speed/Endurance/Flexibility)
- Every session targets the entire body = greater efficiency
- Greater hormonal response due to large muscle groups being trained
- Periodise training to progress and challenge the human body in realistic means
- A more balanced, co-ordinated relationship between the muscular and nervous systems
- A FUN, DIFFERENT, EFFECTIVE way to train with various equipment

THE RELEVANCE OF FUNCTIONAL TRAINING

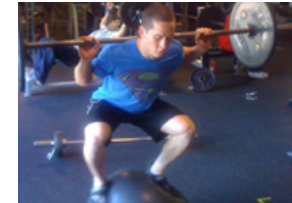
Assimilating functional training strategies into a training program will benefit everyone, from the mother-of-three looking to start physical exercise to the weekend warrior athlete to the elite Olympic competitor preparing for an international event. The actual prescription of functional training will differ between the three individuals in terms of exercises, load and intensity, however all three will gain benefits from basing their training around a functional standpoint. Everyone stands to benefit from functional training, as it can be guided by individual needs and demands of the client.

Based on performance and adaptation, implementing a functional training mentality allows coaches and athletes to challenge and progress their athletes or clients at a steady rate. Training movement patterns associated with activities of daily living will make training relevant to the individual and also increase 'buy-in', as they learn and observe how their increased strength developed through training transfers to a better ability to perform, be it on the sporting field or in everyday life.

Due to the movement patterns associated with functional training, screening is required before a functional training program is prescribed, regardless of the individual. The screening process should assess an individual's mobility and ability to safely achieve various body positions. This will allow the trainer to gauge an understanding of the movement characteristics of their client, and may exclude the client from particular exercises for safety reasons. The screening process can also teach the basics of technique and movement tempo, and is a critical step in the training process.

It is critical when prescribing programs that the goal of each exercise aligns with helping to achieve the client's goals. Basically, everything that is in the training program should have a viable reason for being included. If not, you are not only wasting your time but that of your clients. This will be explained in more detail throughout the manual.

HOW RELEVANT ARE THESE EXERCISES



TO THESE ACTIVITIES



WHAT CAN FUNCTIONAL TRAINING BE USED FOR?

Once understood, functional training ideals can be used for a wide range of purposes.

- Personal Training Sessions
- Group Training Sessions
- Sports Training
- Rehabilitation

FUNCTIONAL ANATOMY

The anatomy of the human body is often looked at in stationary form, about how the muscles interact around a single joint in the anatomical position. From a functional training standpoint, the muscles, skeletal system and joints work as one unit to create movement and perform specific skills. Movement does not occur in the anatomical position and rarely, if ever, are humans subjected to single joint actions in order to achieve a task. Therefore our physical system must be capable of integrating movement over several joints and involve multiple muscle groups in a safe manner in order to perform everyday movements.

A much more functional method of viewing anatomy is considering the muscles as the producers of movement. The neuromuscular system does not work in isolating muscles for movement, but instead initiates movements in which the muscles play a role. It is important that the muscles are synergistic and symmetrical, as this promotes equal, balanced motion. Muscles that are responsible for pulling movements should be equal or close to equal in strength capacity to those involved in pushing movement, to create such a balanced muscular system able to produce force in symmetrical fashion. If there are strength deficiencies in a particular area, there may be an increased injury risk or a performance decrement associated with that area of weakness.

PLANES OF MOTION

All movement can be described as occurring in one or more of three planes:

1. Frontal Plane

Splits the body into anterior and posterior divisions

Movements: Abduction, adduction, inversion, eversion, lateral flexion.

Examples of frontal plane exercises: side lunges, lateral raise, shoulder press

2. Sagittal Plane

Splits the body into left and right divisions

Movements: Flexion/Extension

Examples of sagittal plane exercises: Barbell Squats and Deadlifts, front raises, forwards lunge.

3. Transverse Plane

Splits the body into superior and inferior divisions

Movements: Rotation, Horizontal flexion/extension

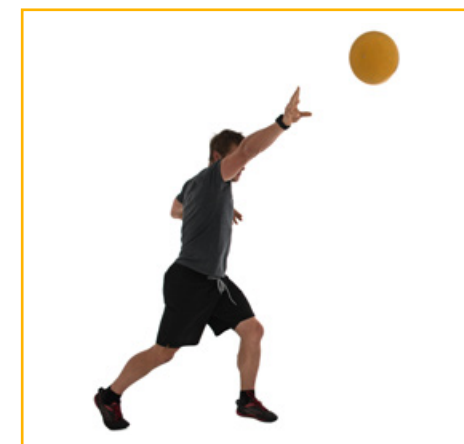
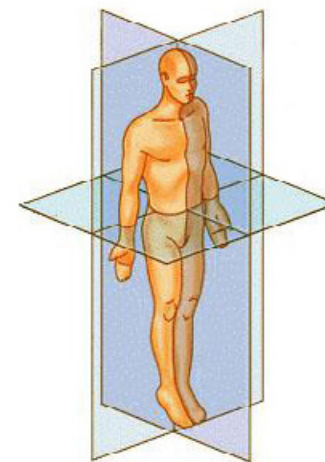
Examples of Transverse plane exercises: Woodchops, Rotational Throws.

Traditional training methods will constrict movement to only occurring in a single plane, whereas functional training involves movement over more than one plane.

This is where functional training excels in its ability to transfer strength and movement, as functional exercises aim to emulate multi-planar movements in sports and daily life. Functional training is 3-Dimensional, with no preference towards a particular plane of movement.

For example, the movement pattern of a clean involves all three planes of motion. Therefore the clean closely relates to many movements in sports that require explosive power off the playing surface and the ability to control the trunk and coordinate a movement with the upper limbs as well (e.g. volleyball spike, leaping for a mark in AFL). Whilst not exactly replicating the sporting movements, the clean trains the co-ordination of the muscles and body position therefore is much more functional than a seated shoulder press for athletes.

Even when we walk, we are undergoing movement in the frontal plane (hip abduction/adduction) as well as the sagittal plane (leg flexion/extension). If we drop something and walk to pick it up, as we bend at the hip we horizontally flex and therefore involve the transverse plane in our movement. Functional training's relationship to daily movements is endless, therefore it makes sense to train the body in such a manner that engages and stimulates movement in all three planes.



FUNCTIONAL ANATOMY

INNER CORE VS. OUTER CORE

The trunk of the body provides the starting point for all human movement. Kicking a football cannot be done without activation of the core musculature, neither can shovelling gravel or painting a wall. Likewise, reaching into the car to undo a child from their car-seat and lifting them out of the car requires a large amount of core activation. Weakness in the core often translates to decreased force production and less efficient movements.

To describe the core system, it is divided into two different identities. The 'inner' core unit is viewed as everything between the pelvic floor and the diaphragm, bordered by the transverse abdominis (anterior) and the lumbar multifidus (posterior). The roles of the inner core unit are to stabilise various segments of the spinal column for movement and to provide appropriate, involuntary muscle activation for respiration. Therefore the inner core is quite reactive, in that it engages without thought. The inner core also provides a strong, coordinated base for human movement. The 'outer' core consists of the 'working' muscles, namely the gluteals, erector spinae, rectus abdominis, latissimus dorsi, adductors and external obliques. They are largely force producing muscles, which provide postural stability and resist external loads.

For productive, functional movement, both core units must work in tandem. The inner core provides spinal stability and a base for movement to work off, whilst the outer core is responsible for producing force and working against a resistance. The outer core unit is unable to create large forces without the solid base provided by the inner core unit, whilst the inner core unit is unable to produce sufficient force and movement to functionally create motion.

THE SLING SYSTEMS

The movement produced by the outer core unit stems from one of four major muscle systems that control human locomotion. These systems are known as 'Sling Systems' and involve coordination of muscles within the human body. Comprehension of the sling systems and their relation to each other provides a greater understanding of human movement - in particular functional movement and how the various movements integrate together.

Evidently, often the sling systems will overlap when a functional movement occurs over multiple planes. For example, pelvic stabilisation is supported by the function of the deep longitudinal system, the anterior oblique system and posterior oblique system when on two legs¹², whilst the lateral system acts to maintain hip position in one-legged movements. In sport, the sling systems closely interrelate in throwing and kicking actions, as well as rotational movements such as swinging implements or wrestling.

In daily work, the sling systems can be integrated through common bending and twisting movements. This lends further weight to the benefits of functional training, as it can prepare the body to work as one unit for planned movements, but also prepare the body for efficient motion for unpredictable actions. Integrating movement in a way that incorporates various sling systems trains the whole body to link segments and ultimately provide efficient, balanced movement.

1. THE DEEP LONGITUDINALS SYSTEM



This system outlines the transfer of energy from the foot during heel strike, through the peroneus longus and biceps femoris of the posterior leg, crossing over to the opposite hip and up through the erector spinae via the sacrotuberous ligament. An arabesque is a great way to train the deep longitudinal sling system, as it requires stability throughout the sacro-iliac joint.

Exercise examples: Split stance contralateral press, Bulgarian bag side to side swing, golf swing.

2. THE ANTERIOR OBLIQUE SYSTEM



The AO system works by creating an anchor point around which the body can rotate to allow for anterior rotation. The adductors of the front leg create this base which allows the outer core oblique muscles to control the trunk during rotation. For example, a stable front leg in a throwing motion allows for the trunk to forcefully rotate to transfer energy up the kinetic chain and into the throwing implement.

Exercise examples: Split stance contralateral press, Bulgarian bag side to side swing, golf swing.

3. THE POSTERIOR OBLIQUE SYSTEM



The PO system is similar to the AO system, but for the posterior muscles in the body. The hamstrings, gluteals and erector spinae in particular will work together to produce hip and trunk extension (think hinge movements like deadlifts) while other core muscles such as the obliques and rectus abdominus work to stabilise the torso. This ensures that force produced is effectively used to propel the body when running for example.

Exercise examples: Off-set lunge, Single leg RDL, Split stance cable row.

4. THE LATERAL SYSTEM



The lateral system keeps the torso upright and the body vertical in general. A laterally leaning position is generally weak and not ideal for either producing or absorbing force. Muscles such as the gluteals, obliques and rectus abdominus work together to maintain stability, perhaps best visualised by an athlete absorbing a bump from an opponent and maintaining their footing.

Exercise examples: Landmine full body twist, Pallof press, Single arm farmers walk

BRACING AND NEUTRAL SPINE



Bracing basically allows the body to lift in the safest possible manner and can be easily achieved and trained. Bracing (known as a high-tension technique) involves co-contraction of transverse abdominis, erector spinae, internal and external obliques, and rectus abdominis, the muscles that surround the spine¹³. Together, these muscles act as the human bodies in-built weight belt, wrapping around the spine to protect and stabilise whilst under load or throughout movement

BREATHING

Increasing the capacity of the thoracic cavity (lung volume) will contract the diaphragm and 'switch on' these core muscles¹¹. This process will co-ordinate trunk musculature throughout the anterior and posterior regions to isometrically contract and provide strong foundation support for all lifts¹⁴.

Taking a large breath in before a lift or movement will raise the intra-abdominal pressure and stabilise the spine. This functions to protect it from the compressive forces that are commonly placed upon the spine throughout lifting, and maintaining the held breath throughout the lift or movement sustains the brace. Exhaling fully before a lift is complete diminishes the pressure and acts as an 'off' switch for spinal stabilisers, increasing the risk of an injury due to insufficient support. This is a process that should be trained, as clients come to understand that maintaining a held breath throughout a movement will aid in their stabilisation.

GLUTE SUPPORT

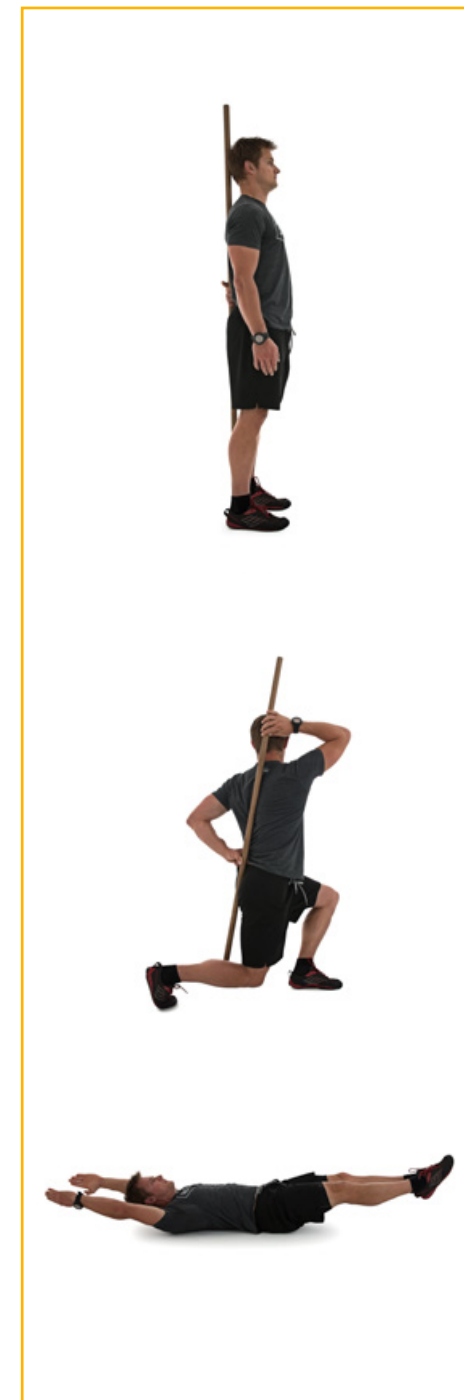
The bracing procedure can be aided by including the lower body in the process. By creating tension through the glutes at the same time as the trunk, the kinetic chain is further supported. The glutes make up one of the most powerful muscle groups in the human body, capable of producing high levels of force and power as well as stabilising the hip complex¹¹. Activation of the glutes will in turn more likely activate the adductors, abductors and surrounding hip flexors to support the lift and brace also. In relation to the sling systems, the lower body is very important in bracing the body and providing a stable base from the foot, through the torso and into the upper limbs.

HOLLOW BODY

Another technique to improve trunk stability is training the hollow-body position. Often used in gymnastics settings, the hollow body position helps to integrate the upper and lower body segments and remain stable throughout particular movements, as well as maintaining a neutral, straight spine. The hollow body position is often taught from the floor. There is no lumbar flexion in the hollow body position, and the position ends when the back 'breaks' off the floor. Improvement in the hollow-body position can be gauged by the position at which an individual 'breaks' and loses stability in their midsection as their legs track towards the ground. The lower the legs to the ground in a controlled trunk position, the greater trunk stability. Improved trunk stability will transfer to the movements discussed in the manual, and improving bracing techniques as the spine is protected. Another advantage is a strong, stable base for initiating limb movement.

TRANSFERABILITY

Once proper bracing and high-tension techniques are learnt, they will be easily transferable to activities away from the lifts discussed in this manual. Whether it be lifting a baby out of the car, carrying shopping bags or completing home renovations, the ability to brace and utilise the core muscles to not only assist in the movement, but protect the spine from injury is invaluable. Likewise, transferring the bracing skill to other training activities to maintain correct posture will occur more readily once learnt and practised. Such activities may involve kettlebell swings, sled push/pulls, hill sprints or power rope workouts, all of which require strong posture and trunk stabilisation as a base for functional movement.



INTRODUCING FUNCTIONAL TRAINING INTO THE PROGRAM



INTRODUCING FUNCTIONAL TRAINING INTO THE PROGRAM

1. NEEDS ANALYSIS

Movements utilised under the 'Functional Training' umbrella should relate to tasks that occur within the specific sports, jobs or daily living. Therefore before any prescription occurs, a needs-analysis should be completed by the trainer and or coach to understand the goals of the client and how to best improve their performance.

It is very important to understand that the needs of clients differ from individual to individual. What is important for one client may not be relevant to your next client. Functional training should be considered with the same mindset. Dependent on activities, sports played, occupation or interests, a movement that is functional for one client may not relate to others. This is a critical concept for the trainer to comprehend, and will make program design much easier and efficient once understood.

A needs-analysis should take into account:

- Goals of the client
- Injury History
- Training age/Fitness Level
- Lifestyle
- Risk/Benefit to the client
- Time constraints of the session
- Predominant energy systems used or required
- Predominant movement patterns/planes used or required
- Dominant muscle groups involved or needed.

Once these factors have been examined, you will have a much stronger understanding of how to best improve performance for your client. This ensures that a 'cookie-cutter' program cannot be implemented, as the results of the needs analysis will differ for most individuals and therefore their training program should be slightly different in parts to cater to their needs.

Whilst the core of a training program may be similar for two different clients, the differences will be evident in the accessory work. As Boyle¹¹ explains, athletes from two different sports may both be aiming to increase speed and decrease body fat mass, and therefore will have largely similar programs despite individual sport differences.

In another example, a client who is undergoing rehabilitation for a knee injury will likely have some form of squats in their program, as would a sprinter who is looking to develop leg strength. However the remainder of the program will likely be quite different, with the rehab client also including some stabilisation drills and isometric contractions whilst the sprinter may incorporate more powerful, plyometric training.

2. SCREENING FOR FUNCTIONAL TRAINING

Before any functional training is undertaken, a thorough screening process should be completed to identify any areas of immobility, weakness or increased injury risk. The screening procedure should also take into account any existing injuries and medical conditions of the individual. It should be noted a screening system is not a diagnostic tool, simply a method to identify any specific areas of interest for the trainer. For diagnosis of muscle or joint injuries, further referral should be undertaken.

Screening particular movement patterns can uncover any limitations or asymmetries in terms of muscle imbalance, joint stiffness and muscle flexibility. Recognition of any problems with the kinetic chain will allow for functional corrective approaches to be put in place to address areas of interest.

Without a functional movement analysis screening tool, the coach or trainer may not realise the risk certain movements place on their client. There are a number of structured screening tools available online and in various texts, with the major focus on joint mobility, muscle flexibility and dynamic stability.

The following 4 exercises provide an example of a basic screening procedure that may be used before any individual is deemed suitable to perform various movements.

Specific screening exercises may differ slightly from trainer to trainer, but the key joints and muscles involved in most movements should be covered in the screening process. It is critical that the coach/assessor is trained in what to look for in terms of movement and coordination, and that the screening does underpin the eventual prescription of exercises.

If the screening process is simply done just to tick a box, without proper analysis, then the client is placed at further risk as they may be subjected to exercises that should have been excluded from the program.

Note: If there is any pain experienced during any of the screening methods, cease the movement in question and always refer your client out to an appropriate health care professional. Of course this could indicate any number of issues or pathologies, and getting a true and accurate diagnosis will give you a clearer idea of what you can and cant do in terms of exercise. Never ignore the problem or allow the client to push on through the pain, this will only cause compensatory movement patterns, further dysfunctional issues and an increased chance for damage and further injury.

INTRODUCING FUNCTIONAL TRAINING INTO THE PROGRAM

BODYWEIGHT SQUAT

The ability to get into a body weight squat position can assess many aspects to the body in terms of coordination, spacial awareness and mobility. Specifically, this screen can look at thoracic, hip, knee and ankle mobility, and is therefore a fantastic screening tool. Taking the screen one step further, a wooden dowel rod can be introduced and an overhead squat can be performed. By simply holding the wooden dowel rod, or even just holding your out stretched arms over head, shoulder and thoracic range can be assessed. Also, being able to move your hips below the level of the knees, will test the lower limb mobility and lumbo-pelvic rhythm.

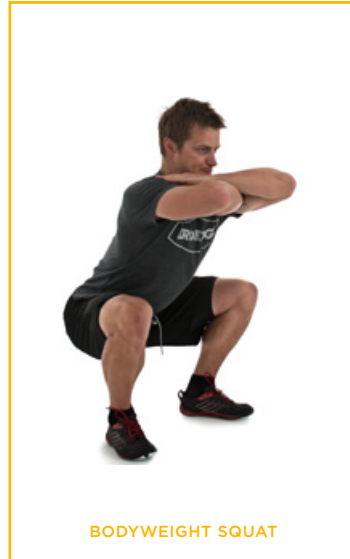
Assessment Points:

Bodyweight Squat

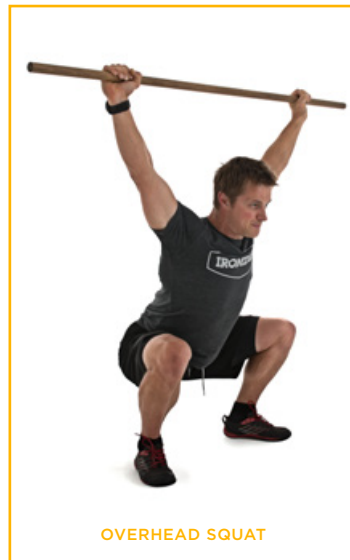
- Let the client find a comfortable squat stance.
- Keep arms crossed across the body.
- Neutral spine needs to be held and maintained throughout the squat.
- Check to see how deep the client can go. Ideal depth is parallel or below. This means the centre of the hip joint should sit in line or below the centre of the patellar.
- Feet should stay flat on the ground.
- Ankles, knees and hips move as one.

Overhead Squat

- To determine hand placement, place the dowel on the top of the head so that you have a 90 degree bend at the elbow.
- Arms should be straight, with dowel rod over base of support.
- Feet flat on the ground.
- Depth should be ideally parallel or below.
- Ankles, knees and hips move as one.



BODYWEIGHT SQUAT



OVERHEAD SQUAT

SHOULDER MOBILITY

A great test for assessing bilateral shoulder mobility is to get the client to try and get their hands as close as possible behind their back, as demonstrated in the image below (left). This assessment tests for both shoulder internal rotation with adduction and shoulder external rotation with abduction. Both shoulders should be assessed as often there are lateral differences due to previous injury, training history or other factors. Results of this test can dictate the prescription of particular shoulder range-of-motion exercises.

Another shoulder mobility screen involves holding arm straight overhead, as it requires stabilisation of the trunk during movement of the upper limbs. If a participant cannot reach directly vertical overhead with zero load, more shoulder mobility should be worked on before overhead exercises are included in the training program.

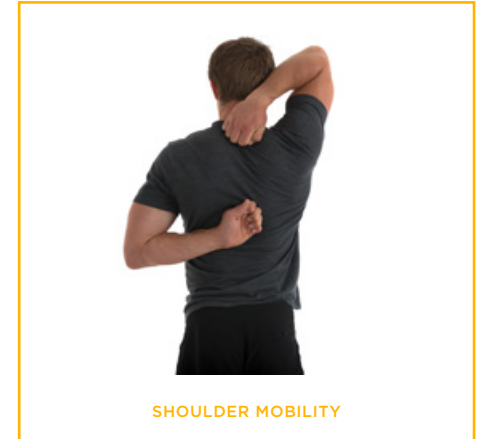
Assessment Points:

Shoulder Mobility

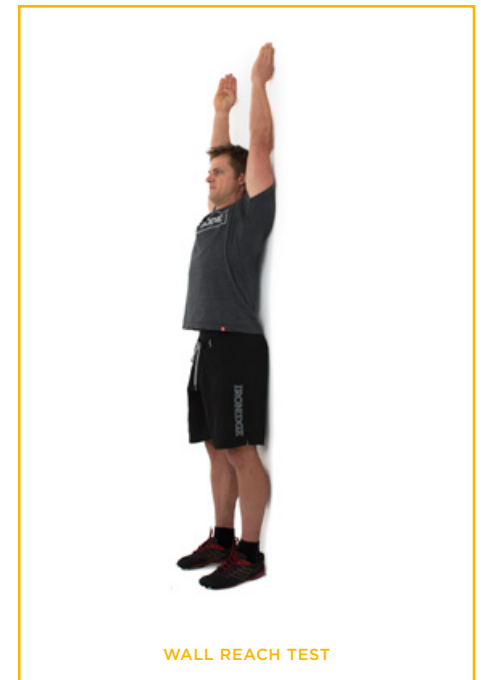
- Use closed fists to perform the test
- Measure knuckle to knuckle.
- Check to see how different the two sides are.

Wall Reach Test

- Ensure neutral spine is maintained.
- Use a wall or a dowel rod to gauge neutral spine alignment.
- Hold the position of hands directly above head.
- Arms should be straight.
- Bicep should line up with the ear, or hands should touch the wall.



SHOULDER MOBILITY



WALL REACH TEST

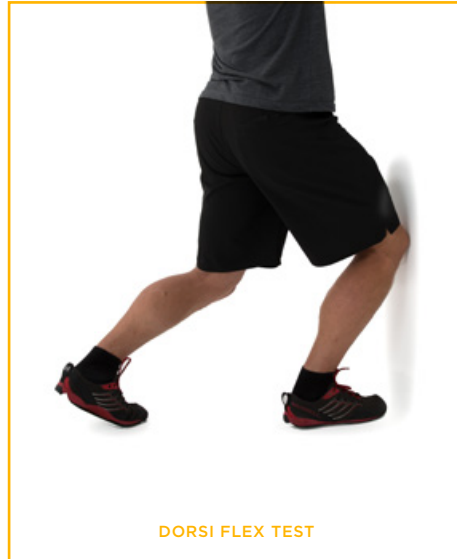
INTRODUCING FUNCTIONAL TRAINING INTO THE PROGRAM

ANKLE DORSIFLEXION

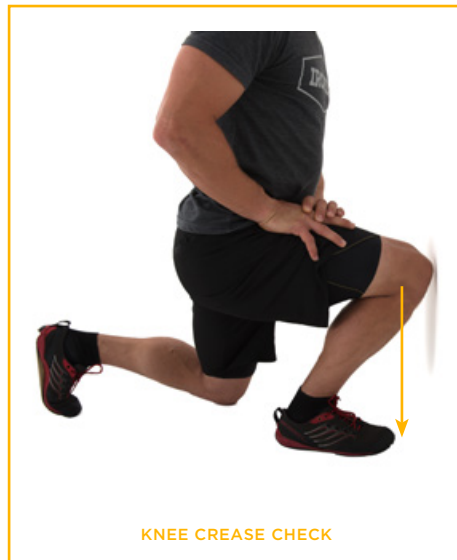
This is a quick, simple test that will assess ankle mobility. Starting with toes against a wall, the client should try and move their knee as close as possible to the wall without raising the heel. If they can touch the wall with their knee in that position, move the foot back in 1cm increments, repeating the movement until the knee can no longer reach the wall.

Assessment Points:

- Ideally, perform this test with no shoes on, or in a minimal style shoe. Raised heel shoes like running shoes will cause inaccuracy in the test.
- Start with the toes touching the wall and push the knee forward to touch the wall.
- Keep the foot flat to the floor with the heel on the ground at all times.
- Slide the foot back 1 or 2 centimeters and try again.
- See how far the foot can slide away from the wall before the knee can no longer touch the wall.
- Ideally, the perfect result for deep squatting and lunging mechanics is where the foot is a distance away from the wall where the knee can still touch, and the crease behind the knee lines up with the end of the toes, or just in front of the toes (Knee crease check picture).
- Pay attention to the distance recorded on both sides of the body. Asymmetrical discrepancies may reflect injury, stiffness and potential risk.



DORSI FLEX TEST



KNEE CREASE CHECK

ANTERIOR AND POSTERIOR HIP MOBILITY

To perform the single leg raise, the client should lay on their back with legs straight, and then bend at the hip to raise one leg as vertical as possible, keeping the knee joint locked. It is important to keep the torso and non-moving leg as flat as possible against the ground's surface. Great test for hip mobility and pelvic control. Unilateral lying leg raise also assesses active hamstring flexibility. Considering active or functional hamstring flexibility is imperative as it relates closer to actual movement than a simple sit-and-reach test, which examines passive flexibility.

The second test is the Thomas test, which can be used for checking hip flexor tightness. This can be an essential test to check to see if the hip flexors are contributing to change to pelvic position and lumbar integrity. Aim to use a bench that is high enough to allow the leg to hang off the ground. Lie on the bench in a supine position, so that the proximal hamstrings are touching the end of the bench. Keep the back and sacrum flat on the bench, and bring knee up toward your chest. Check the position of the opposite leg.

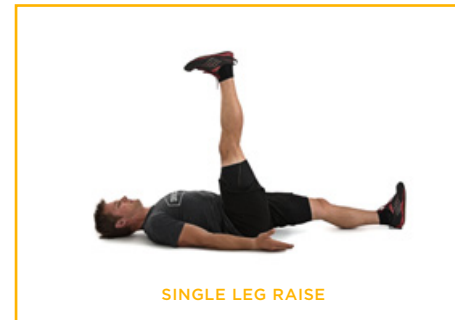
Assessment Points:

Single Leg Raise

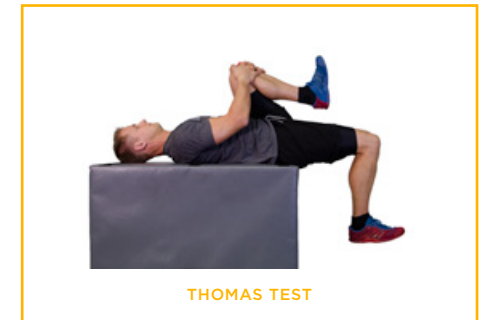
- Raise one leg high, whilst keeping the other leg on the ground.
- Measure with a dowel held vertical, taking record of where the dowel is in relation to the flat leg.

Thomas Test

- Lie on a bench so that the end of the bench lies up with the top of the hamstrings.
- The position of the back should be flat on the bench, including the lower back, no lordosis.
- Draw one knee up and toward the chest.
- The bend in the hanging leg should be between 80 to 90 degrees.
- The hanging leg should be in line with the body. If in this position the knee is elevated above the line of the hips, the hips flexors are potentially tight.
- If the thigh of the hanging leg rises without knee extension – this can indicate a tight iliopsoas.
- If the thigh abducts – this can indicate a tight TFL.
- If the knee extends greater than 90 degrees – this can indicate a tight rectus femoris.



SINGLE LEG RAISE



THOMAS TEST

INTRODUCING FUNCTIONAL TRAINING INTO THE PROGRAM

The screening process is designed to IDENTIFY areas of concern before injuries occur. By completing a simple movement screening assessment prior to functional training, the coach can view the current capabilities of their clients and prescribe some corrective measures to ensure mobility is enhanced to increase potential performance and quality of life.

Screening should occur not only at the beginning of a training program. It is important to regularly screen all individuals to assess training programs and identify any improvements or decrements in mobility. Prevention is the best cure when it comes to physical injuries, as often the strongest predictor of injury is a previous injury to a specific area.

You will notice that all of the screening tools involve some form of body movement, with none performed in a static position. Active tests will give the coach a greater understanding of how their client's body reacts to movement and any areas of specific weakness or pain at any moment during dynamic movement.

3. MOVEMENT SELECTION

By focusing on training specific movement patterns, rather than training specific muscles, a functional training plan ensures that movement relates closely to the actions being trained for. This has been the over-riding focus of the Functional Training pioneers, as training ideals shift away from training individual muscles and concentrate on applying daily movement and sport patterns to the resistance training program. As discussed, the aim of functional training is to strengthen the ability to perform daily tasks or specific movements more efficiently.

Therefore muscle hypertrophy is not often a major goal of functional training programs, with the focus more on mobility and training efficient movement patterns within the kinetic chain. Muscle growth will result from training movements in the correct fashion, and will enhance movement capacity and mobility as it will be functional hypertrophy. Strength in key areas of the body and strength that can be utilised in daily living and sports activity is critical. Compare this to the training of specific muscles in isolation in order to promote muscle growth, which doesn't particularly train the body to move as one unit in a synergetic motion. As discussed, this isolated training process reduces the ability of the body to link and move in a co-ordinated fashion.

TYPES OF MOVEMENT

In basic form, all movements can be described by the following terms, and broken down into fundamental primal movement patterns. Understanding the differences of each will allow the trainer to program relevant movement patterns into the training, to better assist the client or athlete to improve performance. When deciding whether an exercise is appropriate for a client, and is in fact functionally relevant, the following steps must be considered.

1. What are the fundamental primal elements of the movement?

Primal movement elements or patterns are the fundamental building blocks for how we move, produce force and articulate our bodies, whether for manipulating external loads or resistances, or just moving our own bodies through 3 dimensional space. Ultimately this can be broken down into two fundamental actions for how the body produces force, either through pushing or pulling movements. So whether this can be seen as pushing the ground away from us as we vertically jump, or pulling a chin up bar toward us to lift the body upward, the fundamentals are the same.

Pushing: Pushing actions can be completed as either singular or multiple planar movements and can mimic a variety of daily and sporting movements. Examples include squatting, pressing overhead and throwing actions as well as pushing the ground away in a push up, climbing stairs or jumping movements. Upper body pushing motions target shoulder stability and require strong core stabilization to maintain posture when performed from a standing position. Lower body pushing movements generate a large magnitude of muscle activity as well as aligning the hips and torso, which is beneficial for many daily activities.

Pulling: Pulling movements are considered actions that draw or direct a force toward the body, which can also contain singular or multiple movement plane elements. These can target elbow flexion and shoulder extension style movements and relate to daily tasks such as lifting the shopping out the car, or involve actions like dragging a sled, starting a lawn mower or climbing a rope. They are critical types of movements and should not be ignored, as such movement train muscles to stabilise the spine and maintain posture, especially when too much pushing/pressing has been included in the previous training program.

The seven Primal elements of movement: To expand pushing and pulling out further still, and to create a simplistic method for programming, seven essential movement patterns can be created, to develop a systematic approach for training movement in the body.

INTRODUCING FUNCTIONAL TRAINING INTO THE PROGRAM

Squat: The squat pattern is considered the coordinated effort of ankle, knee and hip flexion and extension, aimed at raising and lowering the body's centre of mass for various tasks. Whether these tasks are simply to move into a position of rest closer to the ground, landing safely from a jump or using the body to raise and lower resistance, the squat pattern is a leg dominant movement that strengthens the whole body when performed correctly. Also, the squat can be considered a lower body pushing action that can be performed as a knee dominant action or a balanced ankle, hip and knee flexion and extension movement.

Hinge: Hinging can also be associated with a dominance of posterior chain action, primarily focusing on the bending and extending of the hip complex. These movements can be performed with or without knee flexion and extension, and are the action of leaning the torso forward in a stabilised position. Depending on how we hold a resistance, this can be considered a lower body dominant pulling movement. These movements are also how we move loads and resistances efficiently from the floor, prepare for a jump or swing a kettlebell, ultimately contributing to strength and stability through the posterior chain of muscles, as well as performance in many everyday tasks.

Lunging: The act of lunging is how the body unilaterally moves one leg, in or out of a split stance position, whether to the front, back, laterally or on an angle. Interestingly enough, this can be performed as either a squat or hinge dominant movement which challenges the body in the sagittal, frontal and transverse planes. Focus in lunging is generally directed toward the lead leg in terms of strength and stability, aiming to develop additional forces through that particular leg. Naturally attention must be made to the direction and joint activations, so a clear picture can be drawn to the specific action that is being trained.

Gait: The natural crawling, walking and running patterns of the body often seem simple enough, until you start looking at the mechanics that allow us to move from one location to another. Gait focuses on the natural locomotive movement pattern of the body, also referred to as the action of the limbs to create locomotion, either as a bipedal or quadrupedal action. These coordinated movements allowing the body to transition from one location to another, and can involve simply walking, crawling or running drills and exercises, or loaded variations, carries and farmers walks.

Pushing: As outlined earlier, this is the fundamental action of driving or propelling an object or force away from the body, and is generally associated with upper body dominance as a primal element. In many cases these actions can involve more than just strengthening the arms and upper body and can move into actions that strengthen and stabilise the whole body, from head to toe. Actions can also be broken into vertical and horizontal directions, or elements of both in any direction, depending of course on the exercise that is being performed. These may include push ups, dips, power bag presses or single arm shot puts.

Pulling: Opposite to the push, pulling is the act of drawing or directing an object or force toward the body, and also generally shares the same upper body dominance in action as the push. These movements can also be horizontal or vertical in nature in terms of the line of pull toward the body, or simply a pull in any direction, that can involve just the arm, or integrate more of the body into action. Classic pulls can be chin ups, bent over rows or power band split stance rows.

Midline and Core: These actions focus attention on trunk strength and stability that can actually include one or many of the previous categories. Also, because the torso is the centre of our being, it offers the strong connection between the upper and lower body, and links many if not all of our actions.

Without a strong connection holding the body together, everything breaks down. This category can focus on dynamic or static elements for producing force, and can be seen as generating flexion, extension and rotation, or as bracing against these actions. Understand though, although it is imperative that the body has a capacity to move freely through the torso, in many situations it is our ability to brace and stabilise against force that leads to performance and efficiency. For example, for the body to remain stable so it can produce force in any given direction, it must first brace against the momentum or force already acting upon it. If the body fails here, we can lose balance, miss time a counter movement, over compensate or in sport, get tackled to the ground. This can be seen in a deadlift, lose the capacity to hold the body neutral and tight, and many problems, risks and inefficiencies are created.

Collective or Total Body Patterns: Really these are movements that involve every aspect of the body in a dynamic fashion. Whether in full pulling, pushing or as a combination of a push to pull or vice versa, total body patterns require great amounts of activation and coordination to perform correctly and efficiently. Often, these movements will need to be simplified and practised, before chunking and chaining can shape them into the full movement patterns we wish to learn. These can be very demanding in nature, not only through extensive muscular activation, but through neural activation and often metabolically as well. For example, a Deadball Clean is a great singular exercise, but comprises of a totally body pull from the floor, with an explosive transition to a totally body push, containing three key exercises, the deadlift, the high shrug and the front squat. Obviously competency and strength must be built here, before advancing to the complexity of the Clean.

INTRODUCING FUNCTIONAL TRAINING INTO THE PROGRAM

2. What is the nature of the movement?

Once the primal elements have been understood and established, additional complexity must be considered so that the true nature of the movement can be fully comprehended. The following elements will help to understand how the basic elements can be changes and altered.

- **Bilateral:** Both limbs are balanced and moving in sync with each other e.g. squats/overhead press or volleyball block.
- **Unilateral:** One limb moving independently of its opposite limb. E.g. Medicine ball pistol squat, punching and shot putting.
- **Symmetrical:** The pattern is balanced in nature, where both sides of the body essentially mirror each other. E.g. Power bag front squat.
- **Asymmetrical:** The pattern is unbalanced in nature where generally one side of the body is in a different position to the other, forcing the body to work in multiple movement planes when moving. E.g. Split squats and split stance deadlifts.
- **Contralateral:** Left arm and right leg working together (or vice versa) in a movement. E.g. left arm bent over row standing on right leg or general gait patterns (walking/ running)
- **Ipsilateral:** Left arm and left leg working together (or right and right) in a movement. E.g. left leg RDL with load in left hand or dropping the ball onto the foot in a kicking action.

Essentially once you identify the pattern and the nature of the movement, there are literally endless ways the fundamental patterns can be altered, changed or combined together. A squat can be a basic bilateral movement pattern, or a contralateral bilateral asymmetrically loaded squat pattern, as seen with a Deadball Shoulder Squat.

3. What are the movement variables?

Aside from the traditional variables of sets, repetitions and rest periods, other important variables to consider are as follows:

- **Tempo:** Often brushed over, tempo can really highlight the over focus of the movement in terms of what we are really training for. Tempo of course is the rate or speed of the actual exercise, ultimately deciding whether hypertrophy, strength, power or speed is being trained. So just loading someone up with weight if they are training for speed isn't necessarily the best answer for this outcome. Paying strict attention to tempo when training will give the trainer the best tools for affecting all aspects of the force velocity curve.
- **Movement Plane:** This simply refers to whether a movement is sagittal, frontal or transverse plane dominant. If we wish to be holistic in our approach to training, the movement planes must be balanced and trained. Also, understanding how a simple pattern can be altered to include different planar elements, because a squat can be sagittal in nature, or sagittal, frontal and transverse in nature.
- **Load Type:** This also ties into the nature of the movement, where not only the stance and position can cause challenges to balance and symmetry, but so can the load and how it is positioned. For example, a Deadball front squat would be a bilateral symmetrical exercise, but throw the ball on the shoulder, and now you have a bilateral asymmetrically loaded squat. Use an Aqua Bag in a front squat, and now the front squat shares multiple planar elements that are asymmetrically loading the body.

LOAD

Once the movement is defined by these terms, training programs are able to be created that include movement patterns similar to that required in the sport. It is not necessarily a case of loading up the movement and performing under load to increase stress. The load used in functional training movements should reflect the resistance in the performance or functional task being trained for, or be used to overload specific movements as long as the mechanics of the lift do not change.

In some situations it may be more efficient to train the movement without load at all, as increasing load beyond a particular point can alter movement mechanics. For example, training a cricket fast bowler to rotate the torso and produce strong kinetic chain linkage involving hip drive and shoulder mobility would be detrimental with a heavy load in the palm of the hand, as this would alter technique as the arm would be unable to cope with the heavy load and therefore alter the movement pattern away from what is desired.

Neither is it critical that sport/daily-activity movements are exactly replicated in functional training. The trained movements should relate to aspects of the sport or daily movements, but can effectively and functionally train the sling systems and kinetic chain without precise imitation. For example, the squat is a great functional exercise requiring hip mobility, the production of force throughout the lower limbs and stabilisation of the core and is a great leg strength developer. The squat can still be included in functional training programs for sprinters to improve leg strength and power, despite the movement patterns differing slightly between a squat and a sprinting movement (e.g. horizontal vs. vertical). Joint angles at the knee, hip and ankle are somewhat similar during the squat and a sprinting style, therefore transfer of skill and muscle actions are still functional¹⁵. Co-ordination of muscle contractions in the lower leg also relate somewhat, therefore the squat can be used as an effective, functional exercise for sprinters. Further functional exercises may include loaded sled sprinting or lunging, as these exercises incorporate similar unilateral training aspects¹⁵.

INTRODUCING FUNCTIONAL TRAINING INTO THE PROGRAM

SINGLE LEG EXERCISES

In sport, the majority of action takes place unilaterally, with the body required to stabilise with only one leg in contact with the ground or playing surface. Likewise, many daily activities do not allow for both feet to be steady at the same time prior to movement being initiated¹¹. Therefore from a functional point of view, it would make sense to include lower-body unilateral movements into the program¹¹. As discussed, unilateral movements involve one limb working independently of the other. Simply put, unilateral movements require movement whilst on one leg. Examples of this in training would be a one-legged deadlift, one-legged squat or any lunge movement.

Contrast this with an Olympic Weightlifter, who completes all of their competition using bilateral movements. Although it appears that unilateral movements may not relate to their sport, weightlifters can still benefit from unilateral movements as these type of movements generate greater rate of force development, and greater force production, than bilateral movements.

Training both legs independently unfortunately does not result in being able to be twice as strong when bilateral movements are performed, a phenomenon known as the bilateral deficit, whereby in double leg movements each leg performs less work than in a single-leg movement¹⁶. Still, this provides one of the benefits of single-leg training in that more force production is achieved per leg compared to a bilateral movement. More force production equals stronger adaptations and greater strength for unilateral and bilateral movements. Further, balance is challenged due to the reduction in base of support and the hip stabilizers (glute medius, quadratus lumborum) are called upon to train the lateral sling system and prevent internal rotation of the femur, ensuring balance and hip stability. The functional benefits are seen in running and walking, where individuals have a more synergistic hip complex and imbalances or injury is less likely^{7,11}.

Bilateral lower-limb exercises should be trained and developed prior to introducing single leg exercises, more so to train the movement and generate base levels of strength.

Once single-leg exercises are introduced, they should be integrated in twosteps.

- a) Supported single-leg exercises
- b) Unsupported single-leg exercises

Supported single leg exercises involve a form of support provided by the non-working leg. They are a great starting point for single leg training and include lunges, split squats, whereby the non-working leg is still in contact with the ground or a bench¹¹.

Unsupported single leg exercises take away that support, and are performed solely on one leg. The truest form of this is the one-legged squat, whereby the non-working leg is not allowed to touch the ground. This requires high levels of hip stabilization and should be a progression of the supported single-leg varieties^{7,11}.

STANDING EXERCISES VS. SITTING EXERCISES

Finally, movements should be trained largely in the way that they are applied. In most cases, this involves force applied from a standing position. Tennis players, basketballers, footballers all perform on their feet. The majority of daily activities (gardening, cleaning, climbing stairs, lifting object) all are performed from a standing position. Standing increases muscle recruitment of the core muscles as they are required to continuously work to maintain posture, and have been reported to elicit greater balance and mobility adaptations than seated exercises in terms of improving¹⁷. Overall muscle recruitment is also greater in standing exercise compared to sitting, as the body has to work against gravity to hold itself up¹⁰, especially with external load in the form of a barbell or dumbbells.

It is important not to totally disregard any exercise that involve a seated or lying position, as exercises such as the bench press can be an excellent strength developer for the upper body, and therefore still provides a positive function for the athlete. A great trainer will recognise this, and whilst it may still be involved in the program the majority of work performed and movements will relate to the movement patterns specific to their needs.

This outlines the importance of trainers to be well-versed in functional training principles, and recognise the demands and needs of the athlete and incorporate sufficient functional training stress to elicit the desired training adaptations.

MACHINES AND FUNCTIONAL TRAINING

Functional training strategies are very hard to relate to machine-based exercises. It is not 'functional' to sit on a chest fly machine and remove all core activation from the system, whilst isolating the pectoralis major. Machine-based exercises should be limited to rehabilitation clients who require isolating muscles to build strength levels back up following trauma. When possible, these clients should transfer over to ground-based activities as soon as possible, as in functional movements a muscle is very rarely working in isolation. There has been no research that suggests training on machines is more beneficial than free weights in terms of performance¹⁸, as again gravitational force is largely removed as in most cases the individual will be in a seated position

OPEN & CLOSED CHAIN MOVEMENTS

With so many exercises and movement patterns present in human life, selecting what to train and how to train can be difficult. In order to do so, we must not only look at the types of movements and the plane in which they occur, but also how to best train them. Exercises can be divided into open and closed chain movements, and the muscle recruitment process can differ greatly¹⁸.

CLOSED CHAIN

Peripheral segment is fixed as the body is in motion

OPEN CHAIN

Peripheral segment is free to move around space

In closed chain movements, such as a squat, a chin-up or a push-up, force is applied through the limbs and into a stationary body (ground, chin-up bar) which promotes the body to move. Whilst the feet or hands are stationary, the body is in motion. Compare this to an open-chain movement (bench press/leg press/lat pull down) where the individual's trunk remains in the same position for the entire movement and the peripheral limbs are in motion.

Relating this to functional training, which type of kinetic chain activity is best?

The answer: Closed Chain appears to be the most suitable

This is for a number of reasons. Closed chain movements activate multiple muscle groups, and usually involve more than one joint and require high levels of core stabilization via posture maintenance¹⁹. All of these aspects are intricately linked to functional movement through integration of the entire body, compared to open chain movement in which any core activation is largely removed by having the body seated, muscle groups isolated and joint movement occurring independently^{18, 19}.

As humans walk, the muscles in the posterior chain (glutes and hamstrings) must work to decelerate the leg during the late swing phase, as well as maintaining posture and preventing the trunk from falling forward²⁰. There is joint action at the ankle, knee and hip, as well as global muscle activation throughout the lower limbs and trunk²¹. Therefore it follows logic that when we train, these characteristics should be a focus, instead of unloading the core activation through a seated leg extension that isolates the quadriceps and only trains extension of the knee joint, independent of all other movements.

Again, the situation is different for every individual, therefore the importance of a needs analysis is imperative.



INSTABILITY VS. STABILITY



“

Free weight exercises performed while standing on a stable surface have been proven most effective for enhancing sports related skills.

”

WILLARDSON, 2004

Functional training, as discussed throughout the manual, is aimed at creating a more efficient movement for transfer to sporting skills or daily activities. In most scenarios, these skills or daily tasks do not require strength being applied on an instable surface. This type of training is inferior for functional strength development, as the potential load lifted is much less than if completed on a stable surface. However, more and more trainers are prescribing exercises such as bosu-ball squats under load, which are not only limiting strength gains but are dangerous. In what situation, sport or life, does one have to apply a force on an unstable surface under a heavy load? It takes an understanding of how the body moves in daily life and the knowledge of exercise prescription and movement to properly design correct training exercises.

This trend in training has resulted from trainers and coaches trying to be OVERLYFUNCTIONAL. Performing such an exercise may activate greater core musculature, and an athlete may become more proficient in their squatting technique on an unstable surface, but there is little transfer to any functional movements or functional strength. Further, and perhaps more importantly, an unstable surface limits the amount of force able to be transferred through the ground and therefore lifted²². This means that potential strength gains are being forfeited, as light loads are less likely to elicit strength adaptations.

On an unstable surface, such as a Swiss ball or Bosu ball, the body stiffens and contracts muscles in order to try and maintain balance. The neuromuscular system is overloaded trying to keep the body upright, trying to oppose the external instability by constantly firing muscles to stabilise the body and therefore cannot dedicate energy towards producing maximum strength²².

On a stable surface however, the base is strong and secure, stress is evenly distributed and therefore more force is able to be generated towards external loads. If core muscle STRENGTH is the goal, then perform full-body movements with heavy loads²³. The below quote is taken from a 2004 research study published in the Strength and Conditioning Journal: Push-presses, squats and deadlifts performed correctly require high levels of core strength due to the requirement to stabilise the spine underload²⁴.²⁵. These movements are also more functional in their relationship to everyday activities and sporting movements, and in their capacity to lift heavy loads to elicit training adaptations²³.

Utilising unstable surfaces can have some benefits in rehabilitation scenarios, but for strength gains and performance improvements - STABLE IS THE WAY TO GO.

FUNCTIONAL TRAINING EXERCISES

FUNCTIONAL TRAINING EXERCISES SHOULD MEET THE FOLLOWING GUIDELINES:

1. Functional training exercises work the body over varied or multiple planes.
2. Functional training exercises involve action at multiple joints.
3. Functional training exercises have specific relationships to the desired outcome. This can involve joint angles, movement speed, muscle groups or kinetic chain linkage.

Exercises that do not meet these guidelines may still be considered functional, dependent on the athlete or client. However, it is up to the trainer to be aware of these guidelines and structure functional movements around these, whilst being aware of how to best coach their client.



FUNCTIONAL TRAINING EXERCISES

BACK TO BASICS

Functional training exercises should be based around basic, fundamental human movements. Such movements include bending over, standing up, pulling, pushing, jumping and rotating. A common thread through all of these movements is that they are often performed on foot, and share a strong value in connecting the body from the ground up, to activate and strengthen the entirety of the kinetic chain.

To further classify these movements for our clients and to simply the training and programming process, several categories can be outlined and broken into their primal movement elements. These elemental patterns include: Squatting, Hinging, Lunging, Pulling, Pushing, Gait, and Midline/Core.

Each movement pattern also contains variety in terms of how it can be performed. For example a squat can be performed with body weight, making it an un-loaded bilateral movement. Place a Deadball on the shoulder, and now you have a bilateral, asymmetrically loaded movement pattern, that now challenges the frontal and sagittal movement planes. Although the fundamental squat pattern essentially doesn't change, tremendous variety can be created simply by changing the type of load and position.

Really, from these base primal elements, simple exercises can be altered and changed for dramatically different outcomes and stimulus. The more we understand how these changes affect the fundamental exercise, the more variations we can create, and the more we can understand the relevance that this may have for our clients and their goals.

AS OUTLINED ON PAGE 26 UNDER MOVEMENT SELECTIONS, DETAILS OF THE PRIMAL MOVEMENT CATEGORIES ARE SUMMARISED AS FOLLOWS:

Pattern	Definition	Qualities	Example
Squat	The raising and lowering of the body's centre of gravity through co-ordinated flexion and extension of the ankles, knees and hips. This action may or may not be quad dominant.	Bilateral asymmetrical/symmetrical, unilateral.	Front squats, sumo squats, split squats.
Hinge	The hip dominant action of flexion and extension, with or without knee flexion and extension, for leaning the torso forwards in a stabilised position.	Bilateral asymmetrical/symmetrical, unilateral.	Deadlifts, Romanian deadlifts, single leg deadlifts.
Lunge	Stepping one leg in or out of a squat or hinge pattern.	Unilateral, ipsilateral, contralateral, hip/quad dominant.	Lateral Lunge, Reverse Lunge.
Gait	The natural movement pattern of the limbs to create locomotion.	Quadrupedal, bipedal symmetrical/asymmetrical.	Running, walking, crawling, carrying.
Pushing	The act of driving or propelling a force away from the body.	Bilateral asymmetrical/symmetrical, unilateral, ipsilateral, contralateral, horizontal, vertical.	Push up, punching, Kettlebell press.
Pulling	The act of drawing or directing a force toward the body.	Bilateral asymmetrical/symmetrical, unilateral, ipsilateral, contralateral, horizontal, vertical.	Rowing, bent over row.
Midline/Core	Focusing on creating movement or preventing movement through the torso, either in the frontal, sagittal or transverse planes, or as combinations of each.	Rotational, flexion/extension, lateral flexion, anti-rotational, anti-flexion/extension, anti-lateral flexion	Pallof press, woodchops, hollow body hold.

LOWER BODY DOMINANT PATTERNS

Once we understand the nature of each of the movement categories, the next step is to create balance for our clients in terms of training and programming. This is to ensure that competency and strength is developed holistically, without imbalances occurring or being created. Pushes and pulls, squats and hinges need to be considered, as well as what movement planes are being utilised, and what phases of movement are being stressed. Remember, traditional gym training can be very balanced, sagittal and concentric phase dominant, so be very mindful of how you program your client's sessions if you want to transfer strength and movement quality to other areas of their life. This of course doesn't mean we have free rein for exercise variation and randomisation, it simply means we have to be smarter if we wish our clients to be more effective, efficient and functional.

Programs can also follow various paths, depending upon the overall goals and needs of the client. These can follow upper body, lower body and total body programming structures, depending of course on the frequency of training, lifestyle considerations and training outcomes.

Below are some common exercise examples often seen in functional training programs, highlighting how the fundamental movement patterns can be altered or changed with different equipment. Basic technique with body weight or light loads is critical to master before additional external loads are added, or velocity is increased. As these exercises involve multiple joints, rotation and large muscle groups, technique is important due to the notion that 'form follows function'. Performed incorrectly, these exercises may invoke training adaptations that are not desired, or increase the potential to risk and injury.

SQUAT

DEADBALL SHOULDER SQUAT



Qualities: Bilateral asymmetrical, Quad dominant

Load Type: Asymmetrical

Midline Relationship:
Anti-flexion, Anti-lateral flexion

Movement Plane:
Sagittal, Frontal

Stance: Ideal squat stance

Focus: Strength and Stability

Execution:

- With the Deadball situated on your shoulder, find a comfortable squat stance.
- Take a big breath in and engage a strong neutral spine.
- Lower yourself downward into a squat by co-ordinating flexion of your ankles knees and hips whilst keeping your centre of gravity in the middle of your base of support.
- Lower as deep as you can maintain posture.
- Raise yourself up by maintaining tension and pushing your feet through the floor.
- Breathe out once you have reached the top position.

POWER BAG RACK SPLIT SQUAT



Qualities: Bilateral asymmetrical, Quad dominant

Load Type: Symmetrical

Midline Relationship:
Anti-flexion, Anti-lateral flexion

Movement Plane: Sagittal

Stance: Split stance

Focus: Strength and Stability

Execution:

- With the Power Bag situated in the front rack position, find a comfortable squat stance.
- Take a big breath in and engage a strong neutral spine.
- Lower yourself downward into a squat by co-ordinating flexion of your ankles knees and hips whilst keeping your centre of gravity in the middle of your base of support.
- Aim to keep your elbows up throughout the movement.
- Lower as deep as you can maintain posture.
- Raise yourself up by maintaining tension and pushing your feet through the floor.
- Continue to keep those elbows up.
- Breathe out once you have reached the top position.

LOWER BODY DOMINANT PATTERNS

HINGE

POWER BAG SINGLE LEG DEADLIFT



Qualities: Unilateral

Load Type: Symmetrical

Midline Relationship: Anti-flexion, Anti-lateral flexion

Movement Plane: Sagittal, Frontal

Stance: 1 Foot

Focus: Hypertrophy, Strength and Stability

Execution:

- Hold the Power Bag by the handles, and stand in a hip width stance.
- Take a big breath in and engage a strong neutral spine.
- Lift one leg and push it backward, as you push your hips back on your standing leg, softening your knee as you go.
- Lower as far as you can maintain good position.
- Stay strong through your hips, and rise back to the start position, breathing out once you reach full extension.

TORSONATOR SUITCASE DEADLIFT



Qualities: Bilateral asymmetrical

Load Type: Asymmetrical

Midline Relationship: Anti-flexion, Anti-lateral flexion, Anti-rotation

Movement Plane: Sagittal, Frontal, Transverse

Stance: Hip Width

Focus: Strength and Stability

Execution:

- Ensure the Torsonator has been set up correctly.
- Face the anchor point, standing to the side of the end of the barbell in a hip width stance.
- Grip the end of the barbell in one hand.
- Take a big breath in, stabilise the body, and rise, pushing your feet through the floor, and standing up into full extension.
- Breathe out at the top.
- Breathe in again, stabilise, and push your hips back with soft knees to return to the start position.

LOWER BODY DOMINANT PATTERNS

LUNGE

AQUA BAG LATERAL LUNGE



Qualities: Unilateral

Load Type: Asymmetrical

Midline Relationship: Anti-flexion, Anti-lateral flexion, anti-rotation

Movement Plane: Sagittal, Frontal, Transverse

Stance: 1 Foot

Focus: Hypertrophy, Strength and Stability

Execution:

- With the Aqua Bag situated on the back of your shoulders, find a comfortable stance.
- Take a big breath in and engage a strong neutral spine.
- Step out to the side so you can straighten the knee on your stationary leg.
- Lower as deep as you can maintain posture.
- Try to stack your ankles, knees and hips in a line.
- Push yourself up by maintaining tension and pushing your foot hard into the floor aiming to spring back into the top position.
- Breathe out once you have reached the top position.

SLOSH BALL ZERCHER STEP-UP



Qualities: Unilateral

Load Type: Asymmetrical

Midline Relationship: Anti-flexion, Anti-lateral flexion, Anti-rotation

Movement Plane: Sagittal, Frontal, Transverse

Stance: 1 Foot

Focus: Hypertrophy, Strength and Stability

Execution:

- Clutch a SLOSH Ball to the body in the zercher position.
- Stand facing a plyobox, take a breath in and step one foot onto the box.
- Place your weight into the front foot, staying tall and clutching the ball tight against the body.
- Stay balanced and stand up completely, breathing out at the top.
- Breathe in again, stepping down with control, pretending you are stepping onto a glass step you don't wish to break.
- Return to the start position and breathe out.
- Stay strong and wrestle the ball to remain balanced as you move.

LOWER BODY DOMINANT PATTERNS

GAIT

SLED SPRINT



Qualities: Bipedal, Symmetrical

Midline Relationship: Anti-extension, anti-lateral flexion

Movement Plane: Sagittal, Frontal, Transverse

Stance: Run

Focus: Power and speed strength

Execution:

- Make sure the harness is secured to the sled and is comfortably placed on the body.
- Position yourself so you have a slight amount of tension in the line.
- Drop into a start position and explode into a sprint.
- Adjust your lean according to the weight on the sled.
- Decelerate under control to stop.

SINGLE HAND POWER BAG FARMERS WALK



Qualities: Bipedal, Asymmetrical

Midline Relationship: Anti-flexion/extension, anti-lateral flexion

Movement Plane: Sagittal, Frontal, Transverse

Stance: Walk

Focus: Conditioning and Stability

Execution:

- Grab hold of the two neutral handles on a power bag, drawing them together so they fit in one hand.
- This can also be achieved by grabbing the material of the bag strongly in one hand.
- Hold on tight, staying tall and in control, and walk to the distance that is required.

UPPER BODY DOMINANT PATTERNS

PUSHING

SINGLE ARM HORIZONTAL POWER BAND PRESS



Qualities: Horizontal unilateral, Asymmetrical

Midline Relationship: Anti-extension,
Anti-rotation

Movement Plane: Sagittal, Transverse

Stance: Ideal squat stance

Focus: Hypertrophy, Strength and Stability

Execution:

- Anchor your power band securely around an upright, positioning at shoulder height.
- Place your hand inside the band and hold on a closed fist.
- Pull the band into the shoulder, and turn away from the anchor point, placing as much tension in the band as you need, and moving into a squat stance.
- Breathe in, stabilise your body, and press the band horizontally out in front of you.
- Breathe out at the end of the press.
- Stay strong, and control the band back to the shoulder.
- Make sure you don't exceed the stretch limits of the band.

AQUA BAG PRESS



Qualities: Bipedal, symmetrical

Midline Relationship: Anti-extension,
anti-lateral flexion

Movement Plane: Sagittal, Frontal, Transverse

Stance: Run

Focus: Power and speed strength

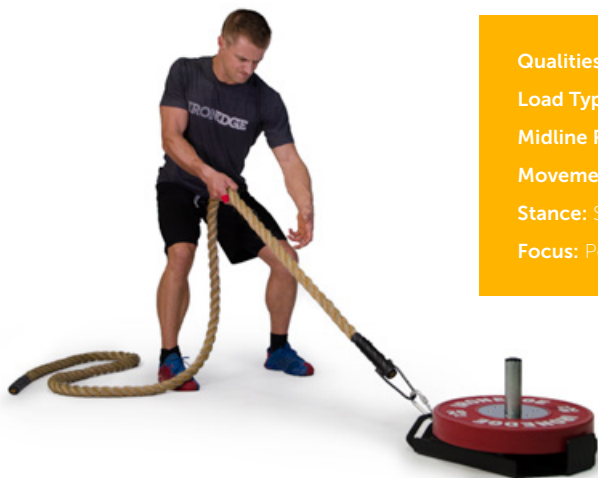
Execution:

- Ensure that the aqua bag has been loaded appropriately.
- Hold the Aqua Bag in the front rack position.
- Balance and stabilise the body from the ground up, breathing in strongly.
- Press the bag from the shoulders, maintaining strong alignment.
- Stay strong and fight the movement of the bag.
- Breathe out at the top, staying switched on and engaged.
- Breathe in again, and pull the bag downward and into the rack position.
- Breathe out and stay strong.

UPPER BODY DOMINANT PATTERNS

PULLING

SLED ALTERNATING ROW DRAG



Qualities: Unilateral horizontal
Load Type: Asymmetrical
Midline Relationship: Anti-flexion, Rotation
Movement Plane: Sagittal, Transverse
Stance: Shoulder width
Focus: Power, Strength and Conditioning

Execution:

- Set a loaded sled up with a rope attachment.
- Hold the rope with tension, and find a shoulder width stance.
- Dig your heels into the ground, and move into a $\frac{1}{4}$ squat position.
- Pull the rope with one arm into the body, and then reach the other arm out to grab the rope.
- Continue reaching and pulling until the sled arrives at your feet.
- Stay strong and balanced through the movement.

POWER BAND CHIN-UP



Qualities: Horizontal unilateral, Asymmetrical
Midline Relationship: Anti-extension, Anti-rotation
Movement Plane: Sagittal, Transverse
Stance: Ideal squat stance
Focus: Hypertrophy, Strength and Stability

Execution:

- Secure a power band over a chin-up bar.
- Step one or both feet into the band.
- Reach up and hold the bar with a pronated, full fingered grip, just outside shoulder width.
- Use the hollow body position to lock and stabilise the body.
- Take a breath in and draw the bar toward the body, drawing the elbows down and into the body.
- Aim to touch the bar to the top of the chest.
- Maintain a strong position, and lower yourself down under control, breathing out at the bottom.
- Stay strong, and avoid letting the band pull you out of position.

UPPER BODY DOMINANT PATTERNS

MIDLINE/CORE

HOLLOW BODY



Qualities: Anti-extension
Load Type: Symmetrical
Midline Relationship: Anti-extension
Movement Plane: Sagittal
Stance: Lying Supine
Focus: Strength and Stability

Execution:

- Assume a supine position on the floor
- Press the small of your back into the ground and create a subtle c-curve to the trunk
- Lock your abdominals tight, and lift you and shoulders from the floor
- Extend your feet, locking the legs and pointing your toes
- Extend your arms over head, and maintain a strong position
- Aim for sets of time

PALLOF PRESS



Qualities: Horizontal unilateral, Asymmetrical
Midline Relationship: Anti-extension, Anti-rotation
Movement Plane: Sagittal, Transverse
Stance: Ideal squat stance
Focus: Hypertrophy, Strength and Stability

Execution:

- Anchor your Power band securely around an upright at around shoulder height
- Clasp the band in your hands, pulling it against your chest
- Turn side 90 degrees to the anchor point, placing enough tension in the band as you need
- Breathe in, and stabilise strongly
- Press the band out in front of your, preventing any rotation of movement from the body
- Breathe out with the press

OVERHEAD PALLOF PRESS



Qualities: Anti-lateral flexion
Load Type: Asymmetrical
Midline Relationship: Anti-lateral flexion
Movement Plane: Frontal
Stance: Shoulder width
Focus: Strength and Stability

Execution:

- Anchor your Power band securely around an upright at around shoulder height
- Clasp the band in your hands, pulling it against your chest
- Turn side 90 degrees to the anchor point, placing enough tension in the band as you need
- Breathe in, and stabilise strongly
- Press the band upward and overhead, preventing any of movement from the rest of the body
- Breathe out with the press

COLLECTIVE OR TOTAL BODY PATTERNS

GAIT

AGILITY BEAR BAND CRAWLS



Qualities: Quadrupedal symmetrical

Load Type: Symmetrical

Midline Relationship: Anti-extension, anti-lateral flexion

Movement Plane: Sagittal, Frontal, Transverse

Stance: Crawl

Focus: Power and Conditioning

Execution:

- Make sure you have secured your agility band around a solid anchor point
- Step into the band, and place the band around the hips
- Move into a quadrupedal position on the floor
- Crawl out to a point, then control your reverse crawl back to the start
- Ensure to band doesn't become overstretched

HURT TERMINAL PUSH



Qualities: Bipedal symmetrical

Load Type: Symmetrical

Midline Relationship: Anti-flexion/extension, anti-lateral flexion, anti-rotation

Movement Plane: Sagittal, frontal, Transverse

Stance: Walk/Run

Focus: Strength and Power

Execution:

- Preload the hurt terminal with an appropriate amount of weight plates
- Grab hold of the handles with straight arms
- Walk your feet backward, and place your body in an aggressive lean
- Take a strong breath in, and push your weight into your feet, pushing and driving the hurt terminal forward
- Continue the effort, staying strong and keeping the hurt terminal moving at a constant pace

COLLECTIVE OR TOTAL BODY PATTERNS

MIDLINE/CORE

TORSONATOR TWIST



Qualities: Pull/Push bilateral asymmetrical
Load Type: Asymmetrical
Midline Relationship: Anti-flexion, Anti-lateral flexion and Anti-rotation
Movement Plane: Sagittal, Frontal, Transverse
Stance: Split stance
Focus: Strength, Power and Stability

Execution:

- Ensure the Torsonator has been loaded correctly, with the appropriate amount of weight
- Bring the end of the barbell up to the chest, clasp it in two hands
- Set your feet in a wider than shoulder width stance
- Extend your elbows and press the bar away from you
- Pivot on your feet to one side, driving strongly through the hips and pushing the bar down toward your hip with straight arms
- Aim to rotate around a central pivot point, staying strong through the midline
- Drive from the hips once again, keeping the arms straight, and bringing the bar back the way it came, pivoting through the feet
- Breathe out when the bar get back to the top

AQUA BAG MONSTER WALKS



Qualities: Bilateral pull to Ipsilateral Rotating Lunge
Load Type: Asymmetrical
Midline Relationship: Anti-flexion, Anti-lateral flexion and Rotation
Movement Plane: Sagittal, Frontal, and Transverse
Stance: Lunge walk
Focus: Strength, Stability and Conditioning

Execution:

- Stand in a squat stance, holding the aqua bag in front of your hips
- Step your left foot forward into a forwards lunge, pushing the bag to the left and over the left leg
- Drive off the left leg, continuing to move forward, turning the bag to the right and stepping the right leg forward
- Stay strong and don't let the bag pull you round as you continue to walk forward

COLLECTIVE OR TOTAL BODY PATTERNS

POWER CLEAN AND SNATCH

MEDICINE BALL POWER CLEAN



Qualities: Pull/Push bilateral asymmetrical
Load Type: Asymmetrical
Midline Relationship: Anti-flexion, Anti-lateral flexion and Anti-rotation
Movement Plane: Sagittal, Frontal, Transverse
Stance: Split stance
Focus: Strength, Power and Stability

Execution:

- Stand over the Deadball in a shoulder width stance
- Bend down and wedge your fingers right under the ball
- Ensure your hips sit higher than your knees, and lock your arms straight
- Take a big breath in, lock everything tight, and deadlift the ball upward
- Aim to fully extend your ankles, knees and hips, shrugging powerfully at the top
- Move your hands around the ball, and drop into a ¼ squat to catch the ball in the front squat position
- Keep your elbows in against the body and stand up straight
- Breathe out at the top

AQUA BAG SNATCH



Qualities: Bilateral pull to Ipsilateral Rotating Lunge
Load Type: Asymmetrical
Midline Relationship: Anti-flexion, Anti-lateral flexion and Rotation
Movement Plane: Sagittal, Frontal, and Transverse
Stance: Lunge walk
Focus: Strength, Stability and Conditioning

Execution:

- Stand with the Aqua Bag sitting in front of your shins, in a hip width stance
- Bend down and grab the handles in a full grip.
- Ensure your hips sit higher than your knees, and lock your arms straight.
- Take a big breath in, lock everything tight, and deadlift the aqua bag upward.
- Aim to fully extend your ankles, knees and hips, shrugging and jumping powerfully at the top.
- Pull the bag upward, dropping into a ¼ overhead squat position, rolling the bag over the wrists and punching out into a strong lockout.
- Stay tight, and fight the natural movement of the Aqua Bag, stabilising strongly against movement.
- Breathe out at the top.

COLLECTIVE OR TOTAL BODY PATTERNS

THROWS

DEADBALL OVERTHROW



Qualities: Bilateral hinge to explosive hip extension and throw.

Load Type: Symmetrical.

Midline Relationship: Anti-flexion.

Movement Plane: Sagittal.

Stance: Hip Width

Focus: Power, Speed and Conditioning

Execution:

- Make sure you have plenty of space to throw the ball safely behind you.
- Stand over the Deadball in a shoulder width stance.
- Bend down and wedge your fingers right under the ball.
- Ensure your hips sit higher than your knees, and lock your arms straight.
- Take a big breath in, lock everything tight, and deadlift the ball upward.
- Aim to fully extend your ankles, knees and hips, shrugging and jumping powerfully at the top.
- Use the momentum of the body to power the ball, aiming to send the ball flying overhead and behind you

DYNAMAX ROTATIONAL THROW



Qualities: Rotational split stance pull to throw.

Load Type: Asymmetrical.

Midline Relationship: Anti-flexion, Anti-lateral flexion and Rotation.

Movement Plane: Frontal and Transverse.

Stance: Split stance

Focus: Power, Speed and Conditioning

Execution:

- Make sure you have plenty of space to throw the ball safely, and/or make sure your partner is ready to catch the ball.
- Stand sideways to the direction you want to throw, standing in a wide sumo stance.
- Pivot away from the direction of the throw and into a ½ lunge position.
- Hold the ball with straight arms, placing the ball on the outside of your knee.
- Pivoting on your feet, rotate powerfully through the hips, bringing the ball through as you turn.
- Extend powerfully, releasing the ball toward your partner, or in the direction of the intended throw.

COLLECTIVE OR TOTAL BODY PATTERNS

SLAMS

LEVEL 2 DEADBALL SLAM



Qualities: Bilateral
Hinge to vertical push to
explosive vertical pull

Load Type: Symmetrical

Midline Relationship:
Anti-flexion/extension

Movement Plane: Sagittal

Stance: Shoulder width stance

Focus: Power, speed and
conditioning

Execution:

- Stand over the top of a deadball in a shoulder width stance.
- Take a breath in and Grip the ball with straight arms, cleaning it to the front rack position.
- Press the ball up and behind the head, maintain a strong position.
- Staying tall, bring the ball through as hard as you can, slamming it down on the floor in front of you, breathing out with the effort.

TURKISH GET UP

MEDICINE BALL TURKISH GET UP



Qualities: Unilateral get up, with hinging, ipsilateral lunging, contralateral stabilising and midline strengthening.

Load Type: Asymmetrical.

Midline Relationship: Flexion, rotation, anti-flexion/extension, anti-lateral flexion, anti-rotation.

Movement Plane: Sagittal, frontal and transverse.

Stance: Lying supine position

Focus: Strength and Stability

Execution:

- Lie on the ground in a supine position with your right arm at a 45 degree angle to the body, palm down.
- Hold a Medicine ball in you left hand, bending your left knee and placing the left foot on the ground.
- Extend you left arm and balance the ball.
- Roll your left shoulder toward your right hip, sitting up to your right elbow.
- Post up onto your right hand with moving your right hand.
- Keep your shoulders packed, and lift your hips off the ground.
- Bring you right leg through, and place the right knee under your hip.
- Stay strong through the midline, hinge, and move into a deep lunge position.
- Reposition your feet, keep pressing the ball away from you, and stand by pushing your weight through your feet.
- Stand tall and balance with your feet together.

COLLECTIVE OR TOTAL BODY PATTERNS

POWER ROPE WAVES

DOUBLE WAVE



Qualities: Bilateral squat pattern with vertical pull/push/pull.

Load Type: Symmetrical

Midline Relationship: Anti-flexion/extension

Movement Plane: Sagittal.

Stance: Hip width stance

Focus: Power and conditioning

Execution:

- Secure your rope to a solid anchor point, making sure you use a barrier to protect the rope.
- Grab the rope in front of the end caps, and stand in a hip width stance.
- Rise upward, and lift the rope high.
- Whip the rope down to create a wave, bending the knees into a $\frac{1}{4}$ squat position.
- Reverse the action and explosively drive the rope back upward again.



PROGRAMMING FUNCTIONAL TRAINING

Now we know the movements that we want to train, and screened our clients or athletes for any specific mobility issues, it is time to design our training program. Caution should be demonstrated here however, and some restraint and careful planning is required to best ensure safety for the your client. An injured client equals no income for you, so injury prevention is high on the list of criteria for a program.

THERE ARE A NUMBER OF FACTORS TO CONSIDER WHEN PROGRAMMING FUNCTIONAL TRAINING:

1. LEARNING THE MOVEMENTS

Chunking And Chaining

When you are learning to drive a car, you don't start out on a 5-lane freeway at 100km/hr. You begin by learning the basic controls, the sensitivity of the steering wheel and the feeling of slowly travelling down the road. The relationship to learning functional training is clear - don't rush into a full-body, complex movement pattern under resistance without first experiencing the different parts of the movement that make up the complete exercise.

Training the different segments of an exercise is an important step, as it cannot only provide functional variety to your training program but also identify any 'weak spots' within the movement that may have gone unnoticed if full complex movements were being performed. Regressing complex exercises into smaller chunks, in the form of assistance exercises, is a fundamental method in learning a new movement pattern and will reduce injury risk and lead to better retention. A great example of this is the clean. The following is an example of a progressional ladder for the Clean

1. Deadlift

The Deadlift is the fundamental start position and is also known as the 1st pull, strength and stability must be built here first.

2: Clean High Pull

Timing is everything with the Clean, consisting of two pulls linked together to generate the power needed to bring the load up and into a rack able position. The first Pull is from the floor as the deadlift,

and the second starts explosively from mid-thigh. This movement regresses the movement into two slow moving parts, so technique and timing can be perfected.

3: Clean Shrug

Once the first and second pulls have been learned with perfect technique, speed and power can be introduced. Heavier loads are introduced and power becomes the focus.

4: Front Squat

The front squat is how the Clean is caught, so strength and stability need to be developed before the bar can be transitioned to the front rack.

5: Hang Power Clean

The Hang power clean is the transition from the second pull to the front rack, and where the arms are taught to scoop through and allow the bar to land on the anterior deltoids. This is taken from mid-thigh to simplify the movement.

6: Hang power clean to Front Squat

Because heavy weights require a very low catch, transitioning from the hang power clean into a front squat can build strength and confidence for dropping and catching the bar in lower positions.

7: Clean pull to hang power clean

Slowly the whole movement from the floor to a full clean needs to be taught, so linking a floor based clean pull to a hang clean can help to put these together.

PROGRAMMING FUNCTIONAL TRAINING



8: Power Clean

The power clean is the stepping stone into a full clean, and links the combination of the Clean pull to hang power clean into one fluid movement.

9: Power Clean to Front squat

Next step is to build strength and confidence from the floor to catching the bar in lower and lower positions.

10: Hang Squat Clean

This teaches effective drop and catch mechanics, as well as developing strength and stability for the catch. This exercise can be taken lower and lower to the ground as confidence and strength develops.

11: Clean

Now that strength, stability, technique and confidence has been established, a full squat Clean can be attempted.

Once the various movements are performed sufficiently in isolation, chaining them together into a fluid, sequenced movement pattern can occur more effectively. When integrated, the movement should train the kinetic chain and in turn challenge the neuromuscular system to a greater degree. Regression chunks can also be used throughout the training program for a number of different uses:

- Add variety to the training program
- Lessen the workload of a session by completing only specific chunks
- Focus on particular training aspects (strength/power/acceleration)
- Increase efficiency of workout/overall movement

2. CONSISTENCY AND STRUCTURE

A good training program will be consistent, having a strong structure that is systematic in its approach. The basic movement patterns will be included regularly, with focus on training the body instead of training muscle. While the specific exercises may be different from session to session, there should be consistent movements within the program. This will ensure the client is not bored with the program and remains stimulated, however still obtains training effect.

Think back to our example before of the man walking into the gym for the first time. His exercise choice was totally random. Solid training program will be structured in a way that the client knows exactly what the expectations of each session are and why each exercise is being completed. Involving your client in the training program, by explaining the benefits of each exercise in a way they can relate to, will maintain their interest in the program and keep them motivated.

Basic movements in a training session should focus on the following categories, and some movements should integrate more than one category:

- Squat patterns e.g. Squat varieties
- Hinge patterns e.g. Deadlift varieties
- Horizontal press e.g. Push ups
- Vertical press e.g. Overhead press
- Horizontal pull e.g. Rowing exercises
- Vertical pull e.g. Chin ups
- Gait patterns e.g. Loaded carry's

- Lunge patterns e.g. forwards, backward and lateral lunges. (Hip vs. Knee dominance)
- Midline/Core e.g. Dynamic vs Static

Just remember balance is the key. There will be some carry over from exercise to exercise, so pay attention to the overall intensity and functional transfer of each exercise. Also, every pattern does not need to be trained in one session, keep things simple and smart, and balance the movement patterns accordingly.

3. FLEXIBILITY AND MOBILITY

A functional training program should involve flexibility training. This may involve static and dynamic stretching, aiming to increase the mobility and range of motion of muscles. Mobility drills also come under this banner of increasing flexibility. These can be easily included in the warm-up for a training session, and should involve taking major joints through progressive range of motion. The ankles, hips and shoulders are involved in many functional training exercises, and as such should be aimed at being as flexible and mobile as possible.

FUNCTIONAL TRAINING EQUIPMENT

In this section, we will look at the various pieces of equipment that allow for variable and adaptive training stimulus. Understand, the fundamental movement patterns are the most important aspect of functional training.

Knowing how to perform basic lifting technique for squatting, lifting, pushing and pulling movements with correct mechanics, and how they relate to either a sporting endeavour or a daily activity, is fundamental knowledge for those involved in functional training. The implement or equipment used is of less importance, and priority should be given to the teaching of correct movement sequencing and linkage of the kinetic chain, instead of specific equipment variations. In essence, technique fundamentals always remain constant, so teach and practise the correct form.

Still, discussion of the implements that can be used is important, and knowing what equipment can be utilised will add variety and stimulation to the training program. After all, training should be exciting and contain small hurdles to overcome every workout. Using various implements will challenge the body to react and stabilise in different ways, whilst maintaining basic fundamental movement patterns relating to the desired goals of the program. Including various pieces of equipment away from regular weight-room implements has been shown to be a stimulus for enjoyable workouts²⁶.

Further, using different implements and equipment can provide a stimulus for 'Imperfection Training'²⁷. This type of training involves using unstable implements or equipment that has slightly different

properties than a regular barbell, and is designed to challenge the body to utilise dynamic stability²⁶. Always training with perfect technique may limit an individual's ability to overcome specific sporting situations, where the body is not always able to be held in ideal position. For example performing cleans with a Power-Bag or Aqua Bag may require the lifter to readjust position throughout the lift to counter the instability of the equipment, and may better prepare an individual for re-adjusting and re-distributing force throughout the body in sport or life.

If the primary movement pattern remains the same, and the essential muscles and joints are undergoing stress in the required magnitude, then basically any external load can be used to add variety and challenge core stability. Care should be taken not to add too much variety in terms of implements and movements however, and ensure enough training load is occurring where necessary to elicit a training response. When training with different tools and objects, the training should still have a largely functional focus, and still remain in line with the goals of training²⁶.

The following pages contain a list of the various pieces of equipment able to be used in functional training programs.



FUNCTIONAL TRAINING EQUIPMENT

POWER BANDS



Power Bands are an exceedingly versatile piece of equipment, than have a virtually unlimited number of applications. Made from layers of latex, Power bands consist of specific sized loop that can be attached to an anchor or used freely in the hands, or wrapped around the body to introduce resistance. Bands also allow you to train a variety of movement patterns that traditional free weight cant train, like horizontal pushes, pulls, rotations and activation. Of course the real benefit here is, the body has to generate strength and stability from the ground up, instead of lying down and changing the specificity of the exercise.

Advantages:

- Available in 41 inch, 12 inch, Micro and Agility.
- Load movements in ways that traditional resistance can't train, like horizontal presses and rows from upright standing positions.
- Can be used in a virtually endless amount of ways.
- Provides accommodating resistance, this works with the natural strength curve of the body, by applying increasing resistance in the phase of movement where the body is at its strongest.
- Super lightweight, water proof and ultra-portable.

Signature Benefits:

- Loads and de-loads a virtually endless amount of exercises, like chin-ups and push-ups.
- Horizontal loading of pushing, pulling and rotational exercises.
- Power bands can be used anchored or un-anchored.
- Can be used with partners.
- Great for activation and mobility work.

Guidelines:

- Ensure that the user has no allergies to latex.
- Use band handles if the band is uncomfortable to use in the hands.
- Always check the working condition the power bands before using.
- Always use a barrier to protect the band when anchoring it objects.
- Never use on sharp or abrasive surfaces.
- Avoid over stretching the band.

POWER BAGS



Power Bags emulate the awkwardness of a flexible or malleable bag of sand, that moves and shifts in the grip, and allows you to rack, grapple and wrestle a variety of different exercises and movement patterns. These bags come in three different types, the standard with handles, the large with handles and the no handled variety. Power Bags are exceedingly versatile in application, allowing you to carry, clean, squat, rotate and swing the bag in just about any plane of motion that you wish.

Advantages:

- Doesn't damage floors, and can be used indoors or outdoors.
- Can be incrementally loaded.
- Comes with inner bags that can be filled with sand and added or removed easily.
- Can be loaded with other objects like Deadballs and medicine balls to change the nature of the load.
- Makes Front squats, back squats and the Olympic lifts more attainable for the broader population.
- Can be used with or without the handles.
- Soft and comfortable to work with, often conforming to the body when racked and held.

Signature Benefits:

- Great for teaching the fundamentals of Olympic lifting, without having to worry about the technical aspects of a barbell.
- Single leg Olympic Lift variations are very effective with the power bag.
- Carries can be performed in a variety of different ways.
- Perform Shoulder loads, Dynamic rows, Monster walks, Swings, Rotations and Halos.

Guidelines:

- Power bags aren't designed for slamming
- Avoid dropping the bag from overhead.
- Avoid overfilling the inner bags.
- Only use fine grade sand when filling the inner bags.
- Avoid dropping on gravel or rough surfaces.
- Avoid wet environments.
- Make sure the bag is completely dried out if it gets wet.

FUNCTIONAL TRAINING EQUIPMENT

AQUA BAGS



Aqua bags are very similar in application to the power bags, with one exceptionally large difference, that water is used instead of sand for incrementally adding resistance. This changes the overall dynamic of the training tool, creating an active resistance that must be wrestled and fought with during exercise. Simple squat patterns and lunges now require the active engagement and recruitment of every muscle in the body, to maintain balance and control, increasing the overall intensity through simply trying to remain steady through movement.

Advantages:

- Can be used indoors and outdoors.
- Is completely weather and water proof.
- Can be incrementally loaded.
- Extremely comfortable to work with.
- Doesn't damage floors.

Signature Benefits:

- Great for teaching the fundamentals of Olympic lifting, without having to worry about the technical aspects of a barbell.
- Makes Front squats, back squats and the Olympic lifts more attainable for the broader population.
- Single leg Olympic Lift variations are very effective with the power bag.
- Power bag carries can be performed in a variety ways.
- Can be use with or without the straps.
- Great for complexes and circuits.
- Perform Shoulder loads, Dynamic rows, Monster walks, Swings.
- Because of the shifting water, many fundamental exercise share multi-planar elements in terms of stabilisation and activation.
- Overhead lunges and carries become very challenging.

Guidelines:

- Only use water for loading and adding resistance to the bag.
- Water is added or removed via the end valve.
- Lock the end valve open when filling or removing water, then lock shut to inflate.
- Aim to under inflate the bag before placing the straps on. Once the straps are secured, finishing inflating the bag.
- Aim to set the handles away from the main seam to protect the hands.
- The Aqua bag should be firm with pressure, not rock hard. Avoid over inflating.
- Avoid dropping the bag from overhead repetitively.
- The Aqua bag isn't designed to be slammed.
- Avoid using on sharp or rough surfaces.

SLOSH BALLS



Slosh Balls share their heritage with the Aqua Bags, offering a way to train with a constantly changing and unbalanced resistance, which continually forces the body to work and stabilise, just to perform simple tasks. Traditionally stability training was performed in unbalanced environments, or on unstable surfaces, but rarely are we placed in situations where we have to produce force in such a way. Dealing with unruly or unbalanced objects or opponents is a far more common occurrence either in life or sport, which is what the aqua products excel at producing.

Advantages:

- Can be used indoors and outdoors.
- Is completely weather and water proof.
- Can be incrementally loaded.
- Extremely comfortable to work with.
- Have no handles which forces you to grip and grapple with it.

Signature Benefits:

- Makes Front squats, shoulder squats and walking lunges quite challenging.
- Slosh ball carries challenge the whole body.
- Great for complexes and circuits.
- Can be used to teach strongman style stone lifts quite simply.
- Because of the shifting water, many fundamental exercise share multi-planar elements in terms of stabilisation and activation.

Guidelines:

- Only use water for loading and adding resistance to the ball.
- Water is added or removed via the valve.
- Lock the valve open when filling or removing water, then lock shut to inflate.
- The Slosh Ball should be firm with pressure, not rock hard. Avoid over inflating.
- Avoid dropping the bag from overhead repetitively.
- The Slosh Ball isn't designed to be slammed.
- Avoid using on sharp or rough surfaces.

FUNCTIONAL TRAINING EQUIPMENT

DEAD BALLS



Deadball Balls come in a large variety of sizes, ranging from 6kg all the way up to 35kg, taking the scope of the standard medicine ball right into the realms for strength and power. These balls are constructed from a high impact rubber and are devoid of handles or hand holds, forcing its user to grip and grapple with it. Deadballs are primarily designed to be dropped, slammed and thrown, without bouncing, rebounding or rolling away, making its user bend down and work for each and every repetition.

Advantages:

- Available in 6, 9, 12, 15, 20, 25, 35kg
- Can be used indoors and outdoors.
- Is completely weather and water proof.
- Extremely comfortable to work with.
- Has no handles which forces you to grip and grapple with it.
- Due to its construction, it is very comfortable to work with.

Signature Benefits:

- Great for teaching the Clean and Strongman style stone lifts.
- Challenging for carries and shoulder squats.
- Slams and throws work extremely well because the ball doesn't bounce or roll away.
- Forces you to grip and grapple with it.
- Sits well on the shoulder and asymmetrically loads the squat and lunges perfectly.

Guidelines:

- Avoid slamming the ball on the valve.
- Avoid slamming the Deadball on abrasive, rough or super hard surfaces.
- Deadballs do become quite slippery when wet, so take caution with wet environments and sweaty hands.
- Make sure areas are clear and free from hazards when throwing.

WALL BALLS



Often referred to as a wall ball, this title doesn't do the Iron Edge wall ball any justice. Essentially the design and make up of this tool is centred on throwing and catching mechanics. The ball size catches the wind to slow its path through the air, while it allows the hands, elbows and shoulders to align perfectly for throwing and catching. Internal padding reduces impact forces when caught, making it ideal for many throwing exercises and conditioning drills.

Advantages:

- Designed to be thrown and caught.
- Available in 8, 12, 14, 20lbs.
- Can be used indoors and outdoors.
- Extremely comfortable to work with.
- Great for speed and power training.
- Great for group tasks and drills.

Signature Benefits:

- Perform chest passes, squat throws, rotational throws, under throws, over throws, shot puts, or many ground based throws.
- Can load various simple movement patterns like squats, deadlifts, presses and rows.

Guidelines:

- Not designed for slamming.
- Always learn the appropriate throwing and catching mechanics.
- Make sure the environment is conclusive for throwing, making sure there are no obstacles or hazards.
- Avoid throwing and catching in wet environments.

FUNCTIONAL TRAINING EQUIPMENT

BULGARIAN BAGS



Deadball Balls come in a large variety of sizes, ranging from 3kg all the way up to 85kg, taking the scope of the standard medicine ball right into the realms for strength and power. These balls are constructed from a high impact rubber and are devoid of handles or hand holds, forcing its user to grip and grapple with it. Deadballs are primarily designed to be dropped, slammed and thrown, without bouncing, rebounding or rolling away, making its user bend down and work for each and every repetition.

Advantages:

- Available in 5, 8, 12, 17 and 22kg weights
- Super strong and exceedingly versatile.
- Can be used with the straps to alleviate the stress to the grip.
- Very soft and comfortable to work with.
- Has many inbuilt handles for gripping and grappling with.

Signature Benefits:

- Train unique tri-planar variations like the Spin, Shoulder load, Arm Throw and Bulgarian Skier.
- Use for traditional weight training movements, like cleans, snatches, squats, rows and presses.
- Can be swung like a kettlebell.
- Can be used for loaded movement conditioning, and for creating movement flows.
- Using the main handles without the straps really challenges grip strength and endurance.

Guidelines:

- When using the main handles, aim to dig your thumb into the handle crease.
- Never swing the bag by the straps.
- Avoid wet and damp environments.
- Avoid slamming the bag down.
- Use the straps for slow grinding style movements.

POWER ROPES



Power Ropes are a conditioning tool that challenges the whole body, by forcing you to use your upper and lower body to produce undulating waves along its length. This activity can be performed in a virtually endless amount of variation, allowing you to move from upper body specific movements, to full body slams and moving and shuffling drills. Considering the overall high intensity of the activity, it is a very easy and simple tool to use, with little to no impact on the joints or structures of the body, making it very accessible to the wider and general populous.

Advantages:

- Quick and easy to set up
- Very simple to teach and use.
- Very portable.
- Can be used indoors and outdoors.
- Available in different types and thicknesses.
- Best performed as a high intensity short duration activity.

Signature Benefits:

- Can be used in long or short set ups.
- Perform doubles waves, alternating waves, figure 8s, diagonals, full body slams, twisting and rotational waves.
- Fundamental waves can be performed while moving, lunging, squatting and jumping.
- Trains grip strength and endurance as well.
- Can be used for tug of war drills and group training.
- Can be tied around sleds and hurt terminals for additional variations.

Guidelines:

- Always use a barrier when securing your rope around an anchor point.
- Aim to use and hold the rope in front of the end caps.
- Always manage fatigue sensibly when training with the power ropes.
- Introduce intensity gradually with new and beginner clients.

FUNCTIONAL TRAINING EQUIPMENT

TORSONATOR™



The Torsonator twist is a tremendous exercise for developing rotational core strength and power, connecting the body from the ground up to produce force and rotation. Although this is a great exercise, it is but one of many exercises in the Torsonator arsenal, allowing beginners and elite athletes alike to gain some amazing benefits. This piece of equipment is essentially a rotating pivot point secured to the ground that allows fundamental exercises like deadlifts, squats, rows and presses to be performed, safely and effectively.

Advantages:

- Available in three different types, depending on the application.
- Increases the adaptability of barbells by providing additional variations of exercises.
- Two Torsonators can be used together for added benefit.
- Can be loaded incrementally to increase the intensity.

Signature Benefits:

- Allows beginners to learn the fundamental mechanics of movements like the Squat and deadlift, in a controlled and guided manner.
- Trains rotational movements like the Torsonator twist, ½ twists, full lunging twist and the Torsonator launch.
- Attach extra handles to aid in exercises or add additional difficulty.
- Torsonator presses can be great for those that have limited shoulder or thoracic mobility.

Guidelines:

- Always progress beginners accordingly.
- Always learn the fundamentals of rotation before learning the Torsonator twist.
- Make sure the barbell has been secured to the unit properly before use.
- Ensure the sleeve has been secured properly to the upright.

SLEDS AND HURT TERMINALS



The main difference between the hurt terminal and the sled is that the Hurt Terminal is essentially designed to be pushed and the Sled has a harness so it can be dragged. This allows you load locomotive movement patterns in many different ways. From traditional resisted sprint work, to full body power exercises, and pushing and pulling exercises these pieces of equipment will develop strength, power and conditioning throughout the whole body. Incorporate a rope, and now you can training dynamic rows and presses, train grip strength moving laterally, as well as many more variations and exercises.

Advantages:

- Allows you to choose an option that best suits your environment and situation, whether it is the sled or hurt terminal.
- Can be incrementally loaded.
- Simple to use and teach.

Signature Benefits:

- Train running and sprint mechanics.
- Trains full body pushing or pulling power.
- Attach a harness or rope to both to create additional training situations.
- Load various pushing and pulling locomotive patterns.

Guidelines:

- Ensure you have an appropriate surface to work on.
- Know the quality you are training. For example, if speed is the focus, light loads will produce the best adaptations.
- Ensure that correct pushing and pulling mechanics are in place before increasing the load and intensity.

FUNCTIONAL TRAINING EQUIPMENT

CLIMBING ROPES



Deceptively simple, the climbing rope teaches and trains the all-important skill of climbing. Often considered an upper body dominant movement, efficient climbing relies on the strength and coordination of the upper and lower body working together to travel upwards. The climbing rope also opens up other variations like body rows and rope pull ups, that not only develop horizontal and vertical pulling strength, but trains grip strength and endurance as well. Clip on to a sled or hurt terminal, and now you can train drags and loaded gait patterns, as well as dynamic rows and presses.

Advantages:

- Can be used inside and outdoors.
- Can be tied or clipped to overhead attachment points.
- Very simple yet challenging to use.
- Has a protective end cap to prevent fraying.
- Made from sisal fibre that is strong and provides plenty of grip.

Signature Benefits:

- Train fundamental climbing mechanics.
- Train exercises like rope pull ups, rope body rows, L-sit climbs, assisted rope pull ups, 1 arm rows.
- Can be attached to sleds and hurt terminals more additional variations.
- Can be used with power bands for creative row and press variation.

Guidelines:

- Ensure rope is secured properly before using.
- Ensure you have a crash mat or safety mat in place when climbing.
- Avoid getting wet.
- Always progress clients accordingly.

CONCLUSION

As you can see, approaching training with a functional mindset can produce great performance gains for your clients and athletes, and will likely provide them with physical capabilities beyond their current training program.

Once fundamental concepts are in place within a program, such as 3-dimensional, full-body integrated movements that train specific movement patterns, the types of specific exercises that are prescribed are endless.

Maintaining dynamic stability and mobility within a movement is critical to relate it to the performance measures. The days of the chest/back/arms workout are numbered for the majority of individuals, as greater knowledge and skills are developed within the training industry. More and more people are recognising the benefits of functional training and structuring their training in such a way to align with functional criteria.

Now you have this knowledge and expertise, get out there and use it. Your clients will thank you, you will observe much better results and the training environment will be reformed for the better!



For over 12 years, Iron Edge has been working closely with Strength & Conditioning coaches, Allied Health practitioners and other leading authorities in the industry.

Through these interactions we have hand-picked the most experienced coaches/practitioners to sit on our panel of Specialist Coaches. These coach's have a range of qualifications and practical experience from private practice to elite sport. Through articles, videos and workshops, you can expect the latest evidence based training information. We aim to cover a range of topics such as Strength and Conditioning, Speed & Agility/COD, Recovery, Rehabilitation, Mobility/Activation and Nutrition.

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