

Six Steps to Success: A Complete Approach to Functional Sports Training

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Philosophy

Our mission is “to build a foundation, prevent injuries, and improve performance.”

How do you get there?

Start with the Olympic Development Teams and work through the pipeline educating athletes, parents, and especially coaches.




Ultimate Teamwork



USA Water Polo Model

10 USA Water Polo Teams (Men's and Women's Cadet, Youth, Junior, Senior A & B) along with the Olympic Development Program and Splashball Program follow the same model for sport performance and injury prevention.

All programs will have the same foundation based on Six Steps for Success.




6 Steps of a Functional Foundation

1. Functional evaluation
2. Core strength
3. Dynamic and Static stretching
4. Balance and proprioception
5. Eccentric training
6. Multi-planar movements and strength training exercises




#1 Functional Evaluation

- ◆ Why? It personalizes the programs for each person and identifies tendencies for a sport, work place, et etc.
- ◆ Performed to identify hypertonic muscles and hypotonic muscles with dynamic movement patterns, static posture, and active range of motion for joints.
- ◆ There are many types of functional evaluations—USA Water Polo ODP uses combination of NASM-PES, mentor Dr. Joe LaCaze and Dr. Vladimir Janda functional evaluation approach. We also believe in the joint-by joint approach by Grey Cook and Mark Boyle.
- ◆ No need to reinvent the wheel. However, each one of us takes the philosophy of a founding father and add our own flare make it our own.



Tested 200 USA Water Polo Athletes

- ◆ Documented static observation of posture
- ◆ Listed any present or pre-existing injuries and hand dominance
- ◆ Measured internal and external rotation of shoulders and hips to identify ROM
- ◆ Performed Movement Patterns:
 - ◆ Full Overhead Squat
 - ◆ Modified Push-up
 - ◆ Side-Lying Hip Abduction



Functional Evaluation Test

Name: _____ DOB: _____ R L Handed

Height: _____ Wing Span: _____

Past Injuries:

| | | | | | |
|-------------|---|---|--------|---|---|
| IR Shoulder | L | R | IR Hip | L | R |
| ER Shoulder | L | R | ER Hip | L | R |

Hip Abduction Movement Patterns

| Left | Right |
|------|---|
| | Excessive shaking or tension |
| | Hip hiking before 30° abduction |
| | Slight hip flexion w/ IR |
| | Slight hip flexion w/ ER |
| | Slight hip flexion w/ knee flex |
| | Decreased abduction $+0^{\circ}$ (check hypertonic rectus) |
| | 3 second hold at end range |

COMMENTS: _____

Push-Up Movement Pattern (modified, keep arms close to body)


| Left | Right |
|------|----------------------------------|
| | Winging |
| | "Kipping" scapula/tilting of T/S |
| | Shoulder elevation |

COMMENTS: _____
Static weight bearing

Full Squat (with hands overhead)

| | |
|--|---|
| | Reduced/irregular ROM |
| | Able to fully deep knee bend past 90° flexion |
| | Asymmetry L/R torso through co-contraction of L/S muscles |
| | Knees are even |
| | Feet placement is equal |
| | Both heels are flat on the ground |
| | Arms extended close at body and elbow straight |

COMMENTS: _____



Posture




What We Found...

- ◆ Common tendencies in water polo players
 - ◆ Posterior chain weakness, especially glute max
 - ◆ Upper Crossed Syndrome with breathing and TMJ issues
 - ◆ Tight posterior shoulder capsule of dominant shoulder and bi-lateral scapula winging/flaring
 - ◆ Extreme forward head carriage
 - ◆ Lower Crossed Syndrome
 - ◆ Hypertonic external oblique and limited internal rotation of the hip on the non-dominant side
 - ◆ Hypertonic rectus femoris and psoas of dominant arm
 - ◆ On the side of the dominate hand, AS of pelvis and hypertonic posterior shoulder capsule
 - ◆ Limited internal hip rotation on the non-dominant side and limited external hip rotation on the dominant side.
- ◆ Overall...altered firing patterns because of muscle weakness
 - ◆ Rhomboids, middle trapezius, lower trapezius, gluteus medius, gluteus maximus, serratus anterior, deep neck flexors, and inner abdominals.



The Janda Approach


| | | | | |
|------------------------|---|--|---|------------------------|
| Upper Crossed Syndrome | Inhibited Deep cervical flexors |  | Facilitated Upper Trap / Levator Scapula | Upper Crossed Syndrome |
| | Facilitated SCM / Pectoralis | | Inhibited Lower Trap / Serratus Ant. | |
| Lower Crossed Syndrome | Inhibited Abdominals | | Facilitated Thoraco-lumbar extensors | Lower Crossed Syndrome |
| | Facilitated Rectus Femoris / Iliopsoas | | Inhibited Gluteus Min / Med / Max | |



Figure 1. Janda's Muscle Inhibition Syndromes

Common Injuries

- ◆ Rotator cuff strain
- ◆ Labral tear/FAI in hip
- ◆ Lumbar sprain/strain
- ◆ Groin strain
- ◆ Patellofemoral Pain Syndrome
- ◆ Concussion
- ◆ Cervical Spain/Strain
- ◆ Sports hernia/rectus abdominis strain
- ◆ Shoulder impingement
- ◆ IT Band Syndrome




Functional Evaluation + Your program

- ◆ Take the information from your evaluation and begin the program modification...
- ◆ Prescribe exercises and stretches that will isolate and eliminate the problem(s) identified in your evaluation.
- ◆ Tissue work, CMT and modalities of choice (KT Tape, Therabands, Intelliskin shirts, PMR, PEMF) can also be used in the process. If you are working with a sport team, discuss your findings with the medical team so that it can be incorporated across the board...
 - ◆ Coach- Focus on engaging core in sport-specific drills, work on the basic fundamental of each position, incorporate breathing techniques
 - ◆ Nutritionist- Discuss hydration, weight loss or weight gain, proper nutritional advice for performance goals and recovery
 - ◆ Strength Coach- add in certain areas to strengthen and/or lengthen based on functional evaluations and position-specific needs



#2 Core Strength

- ◆ One complex unit involving the abdominal wall, pelvis, low back, hips, and inserting muscles of the scapula
- ◆ Take the information from the functional evaluation to determine areas of special focus
- ◆ Teach core bracing before moving into core exercises
- ◆ Core should be engaged at ALL TIMES, especially during sport specific movement
- ◆ Use muscles of the trunk strength to generate force
- ◆ The concept of "Total Chain Movement"
- ◆ Activate muscles of inhalation and expiration without holding breath
- ◆ Fatigue of core leads to changes in biomechanics which lead to injury

Core Strengthening

- ◆ Two Systems
 - ◆ Stabilization System
 - ◆ Transverse abdominis
 - ◆ Internal oblique
 - ◆ Hip external rotators
 - ◆ Lumbar multifidi
 - ◆ Pelvis floor muscles
 - ◆ Diaphragm
 - ◆ Movement System
 - ◆ Latissimus dorsi
 - ◆ External Oblique
 - ◆ Erector spinae
 - ◆ Iliopsoas
 - ◆ Hamstrings
 - ◆ Hip adductors
 - ◆ Glutes





Example of a core water polo routine...

Example of a Core Series (15 seconds per exercise; total of 3 minutes)


- ◆ Reverse Abs
- ◆ Abducted Bicycles
- ◆ Alternating Crunches: Middle, Right and Left
- ◆ Right Side Crunch
- ◆ Left Side Crunch
- ◆ Prone Upper Body Extension: Middle, Right, Left
- ◆ Superman with palms up
- ◆ Butterfly Toe Touches: Middle, Right and Left
- ◆ Hip Ups
- ◆ Side-to-side Reaches
- ◆ Crunches
- ◆ Crunch and hold to the middle

Rotex Series: 4 x 30 sec on hypertonic external oblique side; 2x30 sec opposite hip



#3 Stretching


- ◆ Flexibility is important because the loss of flexibility overall or in a specific joint can result in reduction of movement efficiency and may increase risk of injury during activity (Wenos and Konin 2004)
- ◆ To avoid deficits in flexibility, it is important to incorporate stretching as a key element in an athlete's program for injury prevention and sport performance
- ◆ Cook and Boyle's joint-by-joint approach
- ◆ The two types of stretches that are commonly used for water polo are: static and dynamic stretching



Dynamic vs. Static Stretching


Focus on ankles, hips, mid back and shoulders

| | |
|---|---|
| <ul style="list-style-type: none"> ◆ Dynamic ◆ Before practice: <ul style="list-style-type: none"> ◆ Target each joint throughout entire range of motion. ◆ Challenges flexibility while stressing ROM ◆ Sport specific movements ◆ 10-12 reps of each exercise (or 25 yards) ◆ Approx 12-15 exercises ◆ Increase heart rate ◆ Build into more explosive movements. ◆ Before competition <ul style="list-style-type: none"> ◆ May be an abbreviated version of practice routine | <ul style="list-style-type: none"> ◆ Static ◆ Hold muscle at lengthened position for 30-90 sec, rest 2-10 sec ◆ 2-3 sets ◆ Reduces performance of powerful activities up to one hour after stretching (McNeal and Sands, 2001) ◆ Perform after practice or competition; mornings and before bed |
|---|---|




Dynamic Warm Up Tips

- ◆ Do some type of warm-up before dynamic stretching (cardio, jumping rope, or jogging)
- ◆ Can either be performed on the pool deck, in the pool, or in an area that is open. The length of movement can vary (usually 25 yards).
- ◆ Actively move body part(s) throughout entire range of motion to end range
- ◆ All the muscles should work together with core engaged
- ◆ Do NOT stretch into pain
- ◆ Movements are a controlled pattern with core always engaged




#4 Balance and Proprioception

- Three planes of motion
 - Frontal
 - Sagittal
 - Transverse
- Stable surface before unstable surface
- Use two legs before single leg exercises
- Progression in training is key
 - Challenge the patient/athlete in ways their normal activities would not challenge them
- Sport-specific training is VERY important
 - Example: Water polo athletes do not compete on stable surfaces, so unstable surface training must be incorporated in all three planes




Balance & Proprioception Exercise Examples

- ◆ Exercises
 - ◆ Stork Stand, 3 x 10 seconds
 - ◆ Stork Stand with head flex/extended, 2 x 10 seconds
 - ◆ Stork Stand with head rotation, 2 x 10 seconds
 - ◆ Stork Stands with lateral head bending, 2 x 10 seconds
 - ◆ Shoulder ABC's @ 90 degrees abduction, 2 x's ABC's
 - ◆ Single leg throwing in the mirror, 2 x 10 times
 - ◆ Track starts in the mirror, 2 x 10 times
- ◆ Key points:
 - ◆ Perform balance on each leg or arm
 - ◆ Start out with 10 seconds balance and then increase time.
 - ◆ Can advance to unstable surface (foam, trampoline, or dynadisk)
 - ◆ Progress from head movement to body movement
 - ◆ Progress from eyes open to eyes closed




Balance and Proprioception


Frontal Plane




Sagittal Plane




Transverse Plane






#5 Eccentric Training

- ◆ Eccentric Muscle Contraction
 - ◆ Muscle contraction while an external force causes the muscle to lengthen
 - ◆ The mechanism of many musculoskeletal injuries
- ◆ Often left out of resistance training
 - ◆ Muscles fatigue
 - ◆ Repetitive eccentric contractions in competition
 - ◆ Fatigue leads to changes in biomechanics which lead to injury
- ◆ Teach proper technique
 - ◆ Jumping-Landing
 - ◆ Tandem Tubing



Eccentric Training



| | |
|--|--|
| <ul style="list-style-type: none"> ◆ Jump Rope <ul style="list-style-type: none"> ◆ Great warm-up ◆ Concentric and eccentric contractions ◆ Increase blood flow to entire body ◆ ACL Injury Prevention <ul style="list-style-type: none"> ◆ Proprioception ◆ Strength | <ul style="list-style-type: none"> ◆ Tandem Tubing <ul style="list-style-type: none"> ◆ Performed with partner ◆ Muscular endurance of shoulders and core ◆ Constant tension in tubing is required ◆ Focuses on concentric and eccentric muscle contractions |
|--|--|



Eccentric Training

Tandem Tubing

- ◆ Dynamic warm-up
- ◆ Pre-practice
 - ◆ 1-2 sets
 - ◆ 15-30sec
- ◆ Pre-competition
 - ◆ 1-2 sets
 - ◆ 10-15 sec
- ◆ Strength and Endurance Training
 - ◆ 2-3 sets
 - ◆ 30-60 sec
 - ◆ 2-3x / week

Tandem Tubing

- ◆ Example #1: _____ seconds
- ◆ Small Arm Circles @ 90 degree shoulder abduction, 25 each direction (squeeze shoulder blades together)
 - ◆ Wrist curls, 20 seconds
 - ◆ Punches, 20 seconds
- ◆ Big Arm Circles @ 90 degree shoulder abduction, 25 each direction (squeeze shoulder blades together)
 - ◆ Rows, 20 seconds
 - ◆ Throwing motion, 20 seconds
- ◆ Internal Rotation, 20 seconds
- ◆ External Rotation, 20 seconds

*** Make sure to perform all exercises bilaterally*

#6 Multi-planar movements and strength training exercises

- ◆ Incorporate Steps 1-5, especially the functional evaluation feedback
- ◆ Limitless exercises that can be preformed with body weight and then progress with weight and/or resistance
- ◆ Coupled exercises that incorporate isometric holds and also include explosive power
- ◆ First develop body balance and then move into sport specific explosive movements that are performed at game speed




Transitioning into Multi-Planar Movements

- ◆ Break down the proper squatting technique and proper push up technique before adding multi-planar movements
- ◆ Squatting- Utilize a mirror to develop proper symmetry
 - ◆ Engage the intrinsic muscles of the feet
 - ◆ Engage the core in pelvic neutral with proper posture (shoulder blades down and in)
 - ◆ Push the hips back before bending knees for a controlled decent
 - ◆ Descend without knees over toes-try to lower below 90 degrees with lower leg control and balance
- ◆ Depending on the age and experience with strength training, prescription will vary
 - ◆ Younger athletes and less experienced patients start with body weight exercises and move to more advanced movements with weight

Multi-planar movements and strength training exercises

- ◆ Challenge the patient/athlete in new ways
 - ◆ Creative dynamic Warm Up
 - ◆ Increase resistance and velocity
 - ◆ Add unstable surface
 - ◆ Single leg balance
 - ◆ Incorporate multiple planes within one exercise
 - ◆ Concentric and eccentric contractions
- ◆ If you are working with a team strength coach, two minds can be better than one
 - ◆ Present your findings from the medical perspective and work to develop the best possible sport-specific routine for optimal performance and/or injury rehab and prevention



| USA Water Polo Strength & Conditioning Workouts USA Jr. Team 12 Week Progression | | | | | |
|---|--------------|--------------------------------|-----------|----------------------------|--------------|
| Weeks 1-4 Workouts 1-12 | | | | | |
| Day 1 | | Day 2 | | Day 3 | |
| Exercise | Sets/Reps | Exercise | Sets/Reps | Exercise | Sets/Reps |
| Full Squat w/ weighted upriser | 3x8 | RDL | 3x8 each | Lateral Lunge | 3x8 each |
| Forward Monster Walks | 3x10 each | Supine Pullover | 3x8 | DB Bench | 3x8 |
| Standing Cable Row | 3x8 | Mule Kicks | 3x8 | Hemstring Curl | 3x8 |
| Tricep Push ups | 3x8 | T's & Y's on Ball | 3x6 each | DB Row | 3x8 |
| Plank Series | 3x30 sec | Back Extensions | 3x10 | Forearm Curts | 2x15 (F & E) |
| Core Series 1 | x1 | Core Series 2 | x1 | Core Series 1 | x1 |
| Weeks 5-8 Workouts 13-24 | | | | | |
| Day 1 | | Day 2 | | Day 3 | |
| Exercise | Sets/Reps | Exercise | Sets/Reps | Exercise | Sets/Reps |
| Squat w/ Band to Push Press | 3x8 | Bulgarian Split Squat | 3x8 each | Static Squat to Squat Jump | 3x 20SS, 6SJ |
| Monster Walk | 3x12 each | RDL | 3x8 | DB Bench | 3x8 |
| Single Arm Cable Row | 3x8 each | Lat Pulldowns | 3x8 | Hemstring Curl on Ball | 3x10 |
| Tricep Push ups | 3x10 | Combo mule and kick back | 3x6 each | Single leg DB Row | 3x8 each |
| Plank Series | :30 per side | Back Ext with T's, I's, Y's | 3x5 each | Forearm Curts | 2x20 (F & E) |
| Core Series 2 | x2 | Core Series 1 | x2 | Core Series 2 | x2 |
| Weeks 9-12 Workouts 25-36 | | | | | |
| Day 1 | | Day 2 | | Day 3 | |
| Exercise | Sets/Reps | Exercise | Sets/Reps | Exercise | Sets/Reps |
| Squat w/ DB Push Press | 3x8 | Bulgarian Split Squat w/ press | 3x8 each | Static Squat to 180° Jumps | 3x 20 SS, 10 |
| Monster Walk w/ Twist | 3x5 each | Pullover to Chest Press | 3x8 | DB Incline Bench | 3x8 each |
| High to Low Row | 3x8 each | Bipod DB Row | 3x8 each | Lateral Bounds | 3x8 each |
| Tricep Dips | 3x10 | Throwing Glute Burner | 3x6 each | Ball Walk out with push up | 3x6 |
| Rotating Plank | 3x 45 | DB Back Ext w/ T's, I's, Y's | 3x5 each | Bridge with Figure 4 | 2x10 each |
| Core Series 1 | x2 | Core Series 2 | x2 | Core Series 1 | x2 |

When and how often should I do my routines?

| | Monday | Tuesday | Wednesday | Thursday | Friday |
|----------------------|--|--|--|--|--|
| Morning | Self Static Stretch (upon awakening) Balance Routine Strength Training | Self Static Stretch | Self Static Stretch (upon awakening) Balance Routine Strength Training | Self Static Stretch | Self Static Stretch (upon awakening) Balance Routine Strength Training |
| Pre-Practice | Dynamic Stretching Warm-Up Tandem Tubing Core Circuit | Dynamic Stretching Warm-Up Tandem Tubing Core Circuit | Dynamic Stretching Warm-Up Tandem Tubing Core Circuit | Dynamic Stretching Warm-Up Tandem Tubing Core Circuit | Dynamic Stretching Warm-Up Tandem Tubing Core Circuit |
| Post-Practice | Cool Down Static Stretch | Cool Down Static Stretch | Cool Down Static Stretch | Cool Down Static Stretch | Cool Down Static Stretch |
| Evening | Self Static Stretch | Self Static Stretch | Self Static Stretch | Self Static Stretch | Self Static Stretch |

Personal Recommendations

- ◆ Pro Muscle Release – percussion therapy modality
- ◆ Rotex
- ◆ KT Tape
- ◆ Intelliskin
- ◆ Pulse Electro Magnetic Field Therapy



Tying it Together

- ◆ As an ATC, DC or dual credential who is in charge of a sports team, it is important to be open and versatile in your job.
- ◆ Unique treatments can apply to all professions but Chiropractic is especially unique because it can incorporate soft tissue, physical therapy and manipulation.
- ◆ We have the best of all worlds, and the athletes LOVE it!!!



Any Questions???



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