



# 2020 NSCA COACHES CONFERENCE & LIVESTREAM



#Coaches20

# *CONFLICT OF INTEREST STATEMENT*

*I have no actual or potential conflict of interest in relation to this presentation.*

*A CASE STUDY OF AN OLYMPIC GOLD MEDALIST AND  
HOW AN ISP TEAM MANAGED THE PUZZLE : 3 DAY  
ROLLOVER CYCLES WITH KPI FORMATTING*

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*DAN A. PFAFF*

*ALTIS*

*PHOENIX, AZ*

# *ATHLETE HISTORY, GENETICS AND SPORT DEMANDS AND ENERGY LEAKS*

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*INDUCTION INTERVIEWS  
DEBRIEF SYSTEMS  
GATE KEEPERS  
NETWORKS  
KEY GENETICAL MARKERS*

## Induction History, Sept. 2009

- *AGE 23, 1.90, 86KILOS LWER*
- *15 GRADE 1 OR 2 HAMSTRING/ADDUCTOR TEARS, LEFT LEG*
- *17 GRADE 1 OR 2 HAMSTRING/ADDUCTOR TEARS, RIGHT LEG*
- *TALUS FRACTURE AND REPAIR RIGHT FOOT*
- *LIGAMENT TEARS, BOTH ANKLES; LATERAL AND MEDIAL*
- *HIP LABRUM ISSUE, RIGHT HIP*
- *3 HERNIA SURGERIES*
- *POOR LIFESTYLE, NUMEROUS UPPER RESPIRATORY ISSUES*
- *POOR NUTRITION SKILLS, NUMEROUS GI ISSUES*
- *POOR SLEEP HYGIENE*
- *OVER 200 MISSED SESSIONS ANNUALLY*

# *WHAT ARE THE BIG ROCKS?*

*WHAT DO WE ANALYZE?*

*WHAT CAUSES LEAKS AND ABERRATIONS?*

*HOW DO WE CHANGE THINGS?*



# *WHY EVEN BOTHER?*

- *“COST/BENEFIT ANALYSIS” IS CRITICAL IN DETERMINING CHANGE IN MOVEMENT STRATEGIES.*
- *ENERGY LEAKS OR INTERRUPTIONS*
- *CHRONIC INJURY FACTORS*
- *ACUTE INJURY FACTORS*
- *INTERFERENCE WITH KEY SPORT MOVEMENT NEEDS*



## Chronic and Acute injury factors

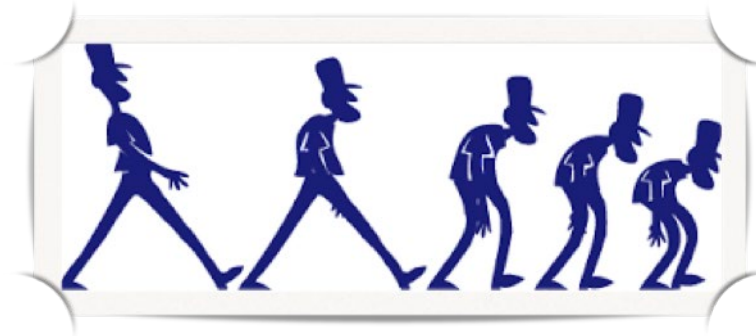
*ENERGY LEAKS CAN LEAD TO BOTH TYPES OF INJURY CLASSIFICATIONS.*

***CHRONIC PAIN AND INJURY** REFERS TO THE SORT OF PHYSICAL **INJURY**, ILLNESS, OR DISEASE THAT DEVELOPS SLOWLY AND IS PERSISTENT AND LONG-LASTING, OR CONSTANTLY RECURRING OVER TIME. MANY **CHRONIC INJURIES** HAVE MILD SYMPTOMS AND LOW-GRADE PAIN, AND ARE OFTEN IGNORED OR SIMPLY OVERLOOKED FOR MONTHS OR EVEN YEARS.*

*AN **ACUTE INJURY** IS AN **INJURY** THAT OCCURS SUDDENLY DURING ACTIVITY, OFTEN A SPRAIN OR STRAIN. A SPRAIN IS AN **INJURY** TO A LIGAMENT CONNECTING BONES – COMMONLY CAUSED BY OVER-STRETCHING AN ANKLE, KNEE OR WRIST. A STRAIN IS AN **INJURY** TO A MUSCLE OR TENDON – COMMONLY DUE TO OVER-STRETCHING AND TEARING THE MUSCLE OR TENDON.*

## ***THE FATIGUE FACTOR IN ALL EQUATIONS***

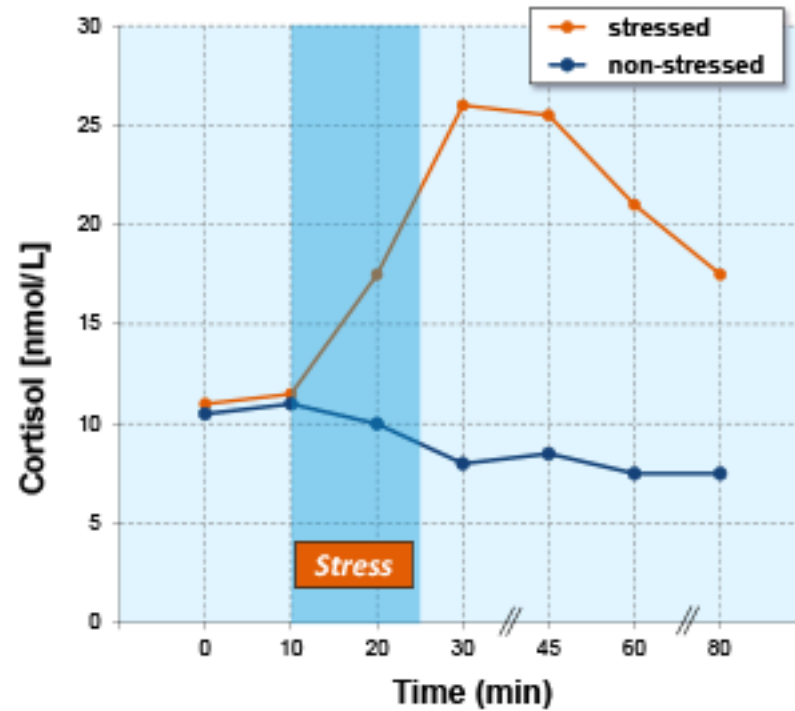
- *TMG AND EMG STUDIES*
- *FORCE PLATES, OPTI-JUMP*
- *3 D KINEMATIC CAMERA SYSTEM*
- *WEAK VERSUS TIRED MUSCLE SYSTEMS?*
- *SESSION, WEEK, CYCLE AND GAMES FACTORS*



# BIOCHEMICAL ASSAYS



Salivary cortisol responses to psychosocial stress<sup>1</sup>



# *ORIGIN OF DESIGN*

- *DOZENS OF ATHLETES ALL OVER THE WORLD AT ONE TIME!*
- *PRE-ERA OF EMAIL, DROPBOX, SKYPE AND THE IT PARADIGM*
- *MY WIFE AND FAMILY*
- *ENVIRONMENTAL FACTORS*
  - Weather
  - Meet Promoters and Agents
  - Facilities and Equipment
  - Travel Issues
  - Support Staff Issues
  - Levels of Performance
  - Health
  - Length of Season
  - Paying the Bills

# *COMPONENTS AND CRITICAL ANALYSIS*

- *JUMP SPECIFIC NEEDS*
- *ACCELERATION AND SPEED ENHANCEMENT NEEDS*
- *POWER MAINTENANCE*
- *RECOVERY*
- *READINESS FOR NEXT COMP*
- *WORK CAPACITY UPKEEP*
- *METRICS FOR ANALYSIS*
- *WELLNESS*
- *BATTERY RECHARGE*
  - Emotional
  - Mental
  - Physical

# How We Coach and Plan



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## The Essentials

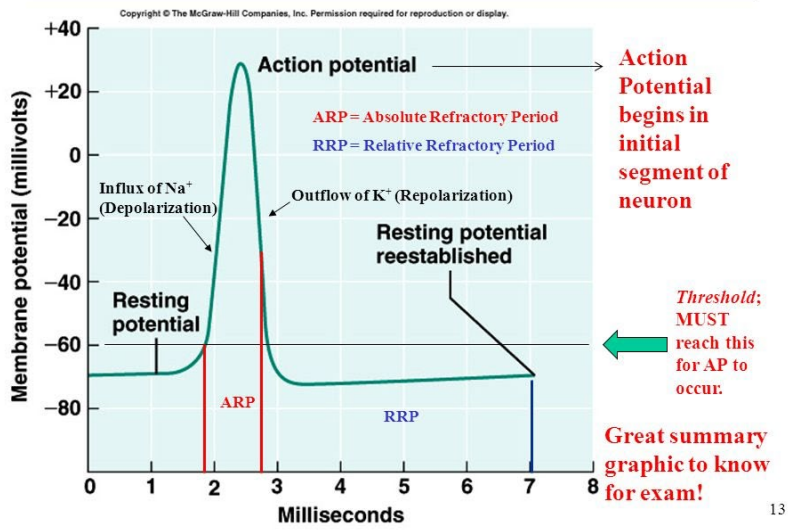
- *MENU ITEMS, BANG FOR THE BUCK RANKING OF KPIS*
- *VOLUME*
- *INTENSITY*
- *DENSITY, THE MOST UNDER UTILIZED VARIABLE.....*

# *THE DENSITY ISSUE IN PROGRAMMING*

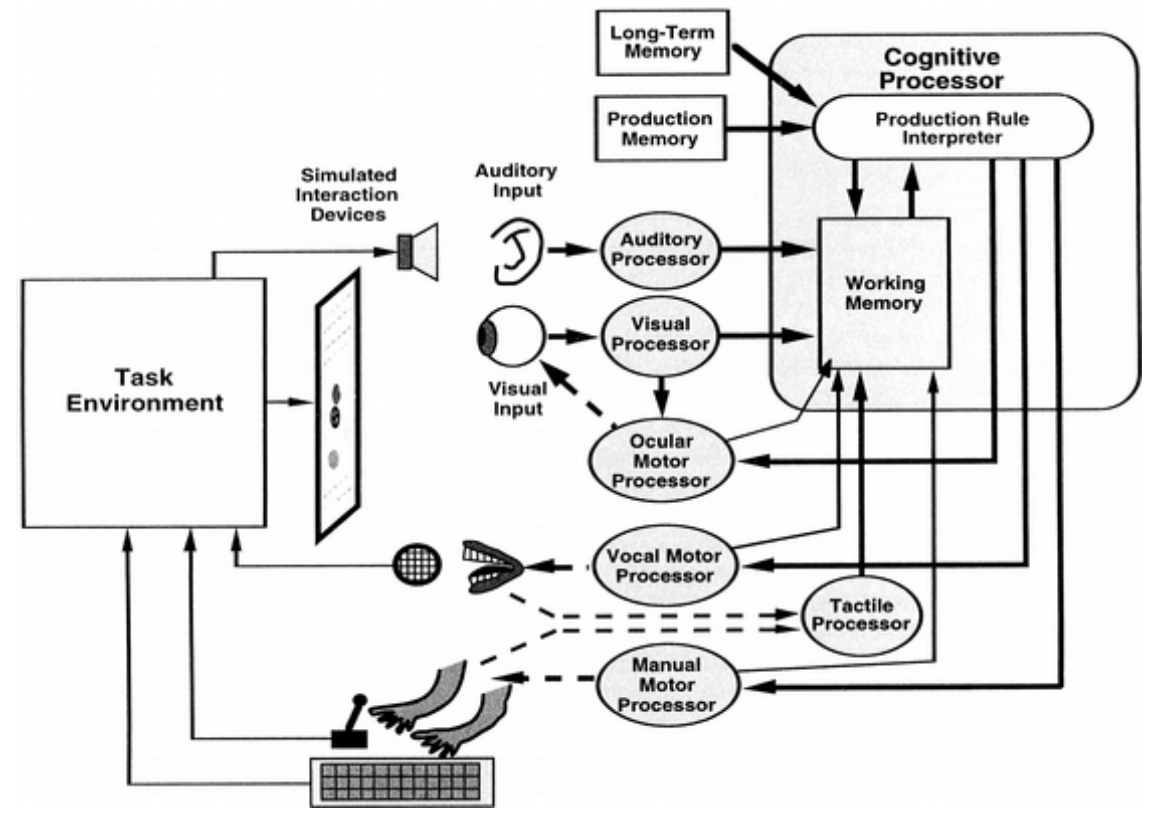
- *RETURN TO PLAY*
- *CHRONIC INJURY MANAGEMENT*
- *AGING ATHLETE*
- *KPI HIERARCHY*
- *BIOLOGICAL BATTERY CONSERVATION*
- *LACK OF RESEARCH ON REFRACTORY PHASES AND DYNAMICS*

# REFRACTORY PERIODS AND CURVES

## Action Potential and Refractory Period

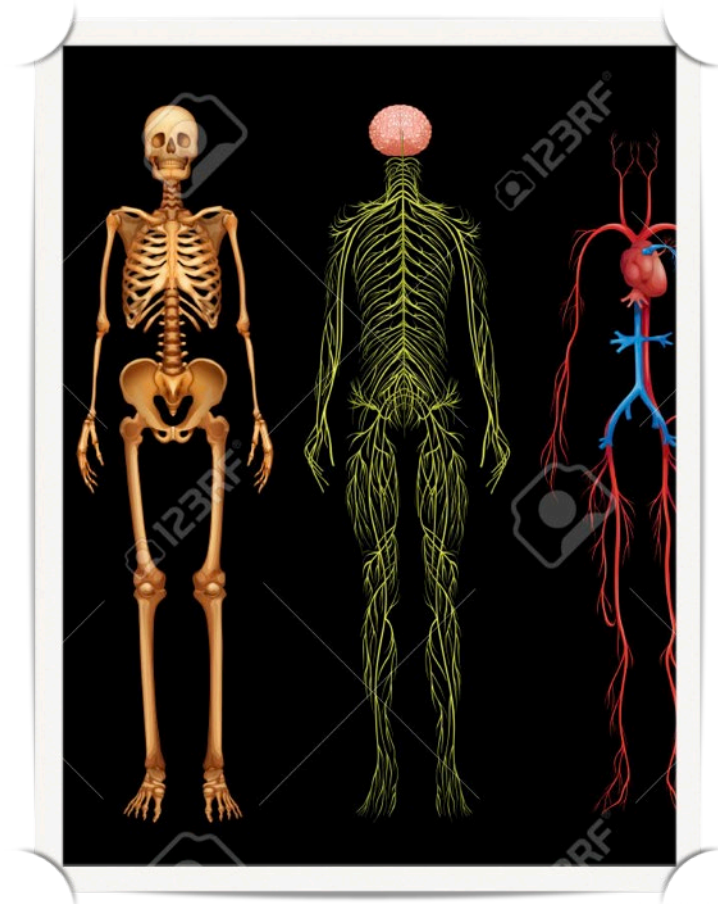


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# MOVEMENT CONTROL FACTORS

- *MUSCLE SYSTEMS*
- *SKELETAL SYSTEM*
- *FASCIAL SYSTEMS*
- *TENDONS, LIGAMENTS, BURSAE, FAT PADS AND CAPSULES*
- *JOINT HYDRAULICS*
- *BRAIN, SPINAL CORD AND CNS*
- *PROPRIOCEPTORS*
- *LYMPHATIC SYSTEM*
- *ORGANS*



# ***HUMAN HYDRAULICS SYSTEMS***

- *COLLAGEN MATRIX*
- *FASCIA*
- *CAPSULES*
- *RETINACULUM*
- *BURSAE*
- *FAT PADS*
- *LYMPHATICS*
- *VASCULAR SYSTEM*
- *VESTIBULAR SYSTEM*



# *MOVEMENT SCREENS OR GRIDS*

- *COACHES HAVE BEEN USING THIS CONCEPT FOR CENTURIES, ITS CALLED WATCHING PRACTICE INTENTLY.*
- *EVERY ITEM ON THE TRAINING SCHEDULE IS A MOVEMENT SCREEN*
- *ONE MUST TRAIN THE EYE TO SEE USING LANDMARKS, PLANES, AXES AND ANGLES.*
- *SEEING IN REAL TIME IS BUILT UPON VIDEO AND PHOTO REVIEW SKILLS.*

# *IS THERE A TECHNICAL MODEL?*

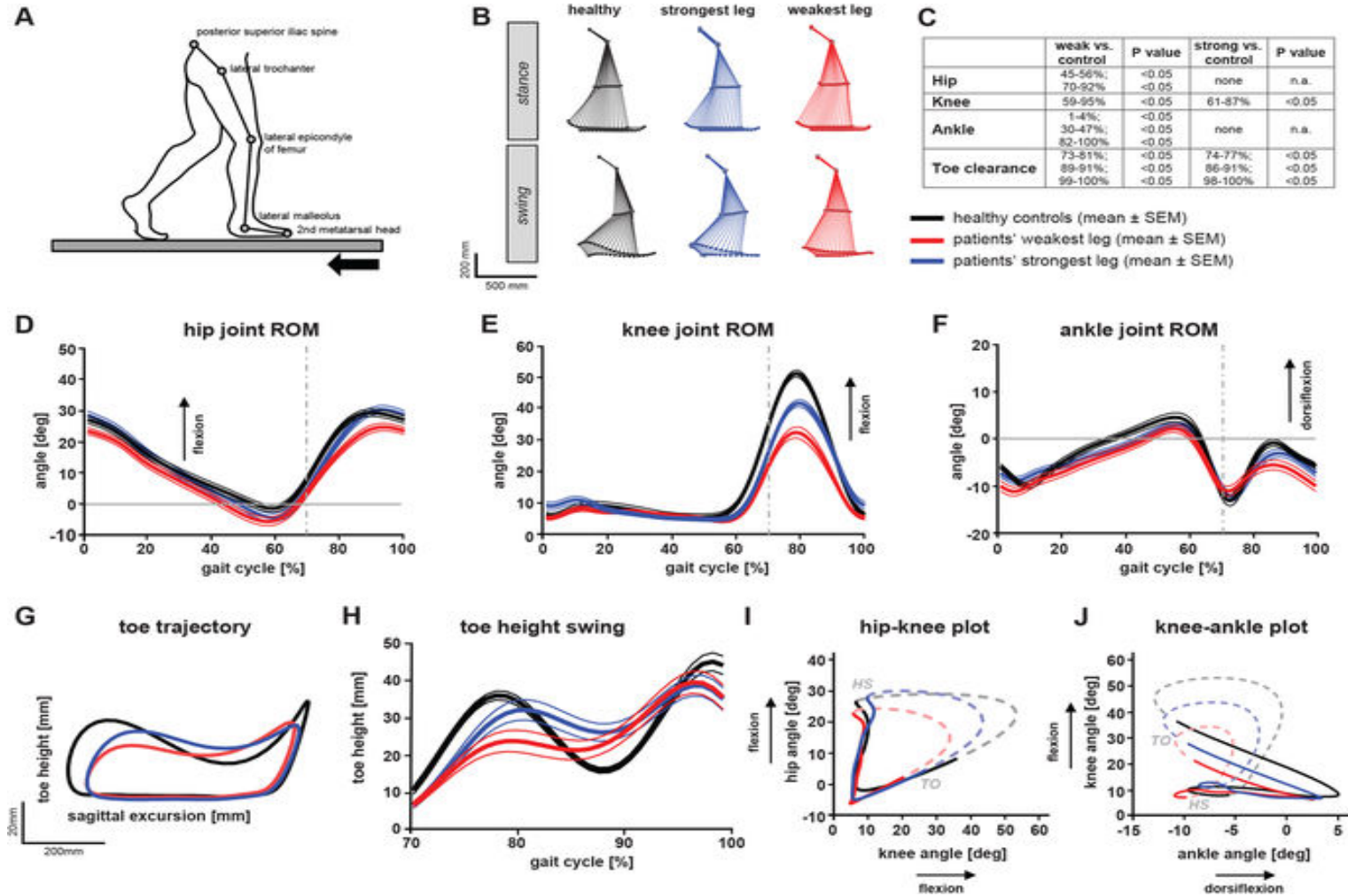
- *COMMON DENOMINATORS OF POSITIONS, MOVEMENT SCHEMES AND VECTORS.*
- *INTRA AND INTER ATHLETE STUDIES ARE CRITICAL. DITTO LONGITUDINAL STUDY.*
- *LOGIC, COMMON SENSE AND REPLICABILITY ARE CRITICAL COACHING TOOLS.*
- *CUE SYSTEMS MUST BE RATIONALLY UTILIZED.*

# Nikolai Bernstein

## *INFERENCE ISSUES?*



# MOVEMENT SIGNATURES



# *EXPRESSION*

*IT IS A BIT MORE  
COMPLICATED THAN  
STRENGTH, POWER AND  
RATE OF FORCE  
DEVELOPMENT.*

*MOVEMENT SIGNATURES  
ARE CRITICAL FACTORS IN  
THE RETURN TO PLAY  
PARADIGM.*

Analysis of

Concurrent

Pathology in

ACL-

Reconstructed

Knees of Elite

Alpine Ski

Racers

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#Coaches20

**2020 NSCA COACHES CONFERENCE**

# Kinetic Sprint Asymmetries on a Non-Motorised Treadmill in rugby union athletes

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## Variability of a “force signature” during windmill softball pitching and relationship between discrete force variables and pitch velocity

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## article info

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## 1. Introduction

## abstract

This study assessed reliability of discrete ground reaction force (GRF) variables over multiple pitching trials, investigated the relationships between discrete GRF variables and pitch velocity (PV) and assessed the variability of the “force signature” or continuous force-time curve during the pitching motion of windmill softball pitchers. Intraclass correlation coefficient (ICC) for all discrete variables was high (0.86–0.99) while the coefficient of variation (CV) was low (0.03–0.10). Discrete variables were significantly correlated to PV: second vertical peak force ( $r(5) = 0.81$ ,  $p = 0.03$ ) and time between peak forces ( $r(5) = 0.79$ ;  $p = 0.03$ ). High ICCs and low CVs support the reliability of discrete GRF and PV variables over multiple trials and

# ***ERGONOMICS, KPIS AND HIERARCHIES***

- *ISOLATORY VERSUS CONCURRENT MYTHOLOGIES*
- *FORCES, VELOCITIES, ANGLES AND MOVEMENT EXPRESSION ARE A DYNAMIC SYSTEM.*



# ***INTERVENTIONS***

- *MOBILITY EXERCISES*
- *PRESCRIBED FLEXIBILITY OR FASCIAL EXERCISES*
- *ACTIVATION EXERCISES*
- *SOFT TISSUE MANIPULATION*
- *JOINT MANIPULATION*
- *ACUPUNCTURE*
- *RECUE CORRECT THEMES OR MOVEMENTS*
- *PLAN B*
- *PLAN C*
- *CESSATION OF SESSION*
- *REFINEMENT OF LONG TERM REHAB/PRE-HAB STRATEGIES*

# DAY 1

- *WARM-UP A OR B, WC OR WELLNESS GRID*
- *ACCELERATION DEVELOPMENT OR APPROACH WORK (10-40M, WITH SETS OF 3 OR 4 X 3 EFFORTS IN EACH SET) USE 2-3' AND 8-12' RECOVERIES; CAN USE BLOCKS, ROLLOVERS OR FLY-INS... EMPHASIZE MECHANICS, RHYTHM AND RELAXATION.....CAN ADD ONE TO TWO SPECIAL SPEED ENDURANCE RUNS WITH 15-20' RECOVERIES AFTER 20' REST FROM FIRST COMPONENT*
- *MULTIPLE JUMP SERIES: 5 X 5 HURDLES AT 30-90CM AND 2-4M SPACING DYNAMIC FORMAT; OR MULTIPLE THROW SERIES GRENADE X 5 REPS (OHB, BLF, REPEAT WITH ONE JUMP BEFORE LAUNCH)CYCLE BALL WEIGHT EACH WEEK*
- *WT. TRAINING: OLYMPIC LIFTS, PRESSES, AND LEG SERIES; ANCILLARY LIFTS: RUSSIAN TWISTS AND NEGATIVE TOE RISERS*
- *COOL DOWN WITH 5' OF JOG/SKIP ROUTINES*
- *HYDROTHERAPY SESSION, 15'. FASCIAL WORK ONLY WITH THERAPIST*

# DAY 2

- *WARM-UP B*
- *JUMP SPECIFIC TECHNICAL TRAINING: APPROACHES X 4-6 AND THEN 10-12 SHORT RUN JUMPS OR COMPETITION SPECIFIC JUMPS OR*
- *TECHNICAL RUNS ON GRASS OR IN FLATS; 6-8 RUNS X 50M , FULL RECOVERY NEEDED!*
- *GENERAL STRENGTH SERIES*
- *MEDICINE BALL SERIES*
- *HURDLE MOBILITY SERIES*
- *COOL DOWN WITH MULTIDIRECTIONAL SERIES FOR 5', SOFT TISSUE WORK DEEP AND MULTIPLE GRIDS BY THERAPIST*
- *SPECIAL NOTE: WE USE THE 3<sup>RD</sup> GENERATIONAL WORK AS MULTIPLE ANALYSIS GRID*

# DAY 3

- *WARM-UP C WITH TARGET SOFT TISSUE LEAD IN*
- *SPEED OR SPECIAL SPEED ENDURANCE RUNS; 2-3SETS X 3 RUNS X 40-60M WITH 2-4 WITHIN SET' AND 10-20' BETWEEN SET RECOVERIES*
- *ALTERNATIVE WORKOUT OPTIONS: ALACTIC RUNS OF 1-2 X 90 OR 120M SFS RUNS; USE FULL RECOVERY; OR 3 X 90M WITH 8'-10' AT 90% RHYTHM MOTIF*
- *ELASTIC ENDURANCE SERIES: SKIPS FOR HEIGHT AND DISTANCE, SCISSOR BOUNDS, ALTERNATE LEG BOUNDS, ETC. (TOTAL 300- 500M WORKLOADS)*
- *WT. TRAINING. AS ON MONDAY WITH VARIATIONS OR ELIMINATIONS*
- *MIXED COOL DOWN RHYTHMS*
- *MIXED HYDROTHERAPY SESSION, 2 HOT, 1 COLD; RECOVERY MASSAGE ONLY*

# *2012 OLYMPIC DEBRIEF*

- *OLYMPIC GOLD MEDAL*
- *18 COMPETITIONS COMPLETED*
- *12 MISSED SESSIONS*
- *2 GRADE 2 TEARS RIGHT MEDIAL HAMSTRINGS*
- *1 STRESS REACTION CUBOID, RIGHT FOOT*
- *1 UMBILICAL HERNIA*
- *3 RESPIRATORY BOUTS*
- *1 FOOD POISONING EPISODE*

# *INSIGHTS*

- *HAS ALLOWED FOR CONSISTENT LEVELS OF HIGH PERFORMANCE FOR UP TO 3 MONTHS.*
- *ONE ATHLETE DUE TO CIRCUMSTANCES USED IT FOR 10 MONTHS AND EXCELLED IN MULTIPLE COMPONENTS*
- *IMPROVES COACH SANITY LEVELS*
- *SIMPLIFIES FEEDBACK FROM ATHLETES AND PERFORMANCE SERVICE PROVIDERS*
- *THERE IS COMFORT IN ROUTINES*
- *IT FORCES BOTH THE ATHLETE AND COACH TO DEFINE KPI'S AND METRICS OF PERFORMANCE*

