

Virginia Commonwealth University

## VCU


RETURN TO RUN PROGRESSION:  
Testing and Interventions

D. S. Blaise Williams III, PT, Ph.D.  
VCU RUN LAB  
Department of Physical Therapy  
Virginia Commonwealth University

**VCU RUN LAB**  
run better

### Cross-training and Running


- Until recently, most runners did not include cross-training as part of their running or race training preparation
- Several training programs have focused on fewer, more focused running days with 2-3 cross-training days



**VCU RUN LAB** **VCU**

### Cross-training and Running


- Traditionally cross-training has been in the form of other types of endurance activities
- These activities are biased toward non-weight bearing or minimal weight bearing activities
  - Swimming
  - Cycling
  - Rowing
  - Elliptical
  - Versa Climber



**VCU RUN LAB** **VCU**

### Cross-training and Running

- THIS MAKES SENSE!
  - Most running injuries are due to overuse
  - Running requires that we impact the ground over 1000 times per mile at 3-4x our body weight
  - Choosing activities that reduce impact while still training the cardiovascular system allow the runner to remain trained while protecting the musculoskeletal system



**VCU RUN LAB** **VCU**

### Cross-training and Running




- Injuries are related to exposure (too many miles) but also can be related to physical abnormalities
- Running-related injuries have been associated with decreased strength in several muscles and joints of the lower extremities
  - Hips
  - Core
  - Quadriceps
  - Calves

**VCU RUN LAB** **VCU**

### Cross-training and Running

- Strength training is shown to have positive effects on
  - lower extremity mechanics
  - Performance
  - Injury?



**VCU RUN LAB** **VCU**

## Cross-training and Running

- Runners can use cross training to:
  - Aid in recovery from injury
  - Prepare to begin a running program (get strong)
  - Augment their training while decreasing impact



## Cross-training and Running

- THE TEST
  - Used to determine what types of exercises to include in the circuit
  - Tests muscles and movements important in running



## Cross-training and Running

- TEST 1: STEP UPS (1 minute)
  - No rest
  - Good form
    - Knee position
    - Trunk position



## Cross-training and Running

- TEST 1: STEP UPS
  - Quads and gluts
  - Poor Form
    - Forward Lean
    - Knees together
    - Slow speed



## Cross-training and Running

- TEST 2: HOPPING (1 minute)
  - No rest
  - Good Form
    - Hop off toes
    - Knees apart



## Cross-training and Running

- TEST 2: HOPPING
  - Calves and quads
  - Coordination
  - Poor Form
    - Flat feet
    - Knees together



## Cross-training and Running

- TEST 2: HOPPING
  - Calves and quads
  - Coordination
  - Poor Form
    - Flat feet
    - Knees together



VCU  
RUN  
LAB

VCU

## Cross-training and Running

- TEST 3: WALL SIT (1 minute)
  - No rest
  - Good Form
    - Quads parallel
    - Trunk upright
    - Equal WB



VCU  
RUN  
LAB

VCU

## Cross-training and Running

- TEST 3: WALL SIT
  - Quads
  - Core
  - Poor form
    - Forward lean
    - Non-parallel legs



VCU  
RUN  
LAB

VCU

## Cross-training and Running

- TEST 4: SINGLE LEG SQUAT x 10
  - No rest
  - No loss of balance
  - Good Form
    - Level hips
    - Upright trunk



VCU  
RUN  
LAB

VCU

## Cross-training and Running

- TEST 4: SINGLE LEG SQUAT
  - Quads
  - Hips
  - Core
  - Poor form
    - Hip drop
    - Opposite lean
    - Knee position



VCU  
RUN  
LAB

VCU

## Cross-training and Running

- TEST 4: SINGLE LEG SQUAT
  - Quads
  - Hips
  - Core
  - Poor form
    - Hip drop
    - Opposite lean
    - Knee position



VCU  
RUN  
LAB

VCU

## Cross-training and Running

- TEST 5: DOUBLE LEG SQUAT x 10
  - No rest
  - Good Form
    - Knees apart
    - Upright trunk
    - Equal WB



VCU  
RUN  
LAB

VCU

## Cross-training and Running

- TEST 5: DOUBLE LEG SQUAT
  - Quads
  - Hips
  - Core
  - Poor form
    - Forward lean
    - Knee position



VCU  
RUN  
LAB

VCU

## Cross-training and Running

- TEST 6: PLANK (1 minute)
  - No rest
  - Good Form
    - Straight line
    - Equal WB
    - Head alignment



VCU  
RUN  
LAB

VCU

## Cross-training and Running

- TEST 6: PLANK
  - Core
  - Hips
  - Gluts
  - Poor form
    - High hips
    - Low hips
    - Weight shifting



VCU  
RUN  
LAB

VCU

## Cross-training and Running

- Deficiencies in:
  - SLS
  - DLS
  - Plank

2 of 3 → CORE/HIP
- Deficiencies in:
  - Hopping
  - Step-ups
  - Wall sit

2 of 3 → LEG

VCU  
RUN  
LAB

VCU

## Cross-training and Running

- CORE/HIP Deficiencies
  - 50% Core/Hip exercises
  - 25% Leg exercises
  - 25% endurance



VCU  
RUN  
LAB

VCU

## Cross-training and Running

- LEG Deficiencies
  - 50% Leg exercises
  - 25% Core/Hip exercises
  - 25% endurance



## Cross-training and Running

- LEG EXERCISES
  - General concepts
    - Body weight supported
    - Eccentric/concentric (stretch-shortening)
    - Reciprocal
    - Single leg
    - Complete for time OR to fatigue



## Cross-training and Running

- LEG EXERCISES



FAST SQUATS



STANDING LEG EXTENSIONS



LUNGES



## Cross-training and Running

- LEG EXERCISES



FAST STEP UPS



SINGLE LEG BRIDGES  
(flat foot and heel)



## Cross-training and Running

- LEG EXERCISES



SWITCH LUNGES



BUTT KICKS

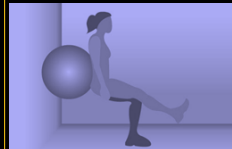


SIDE LUNGES



## Cross-training and Running

- LEG EXERCISES



SINGLE LEG BALL SQUATS



SINGLE LEG SQUATS  
(fast)



SIDE STEP-UPS  
(fast)



## Cross-training and Running

- LEG EXERCISES



PLYO SQUATS  
(fast)



## Cross-training and Running

- CORE EXERCISES



TWIST CRUNCHES



WEIGHT BALL TOE TOUCHES



## Cross-training and Running

- CORE EXERCISES



BICYCLE CRUNCHES

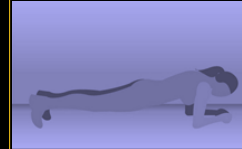


REVERSE CRUNCHES



## Cross-training and Running

- CORE EXERCISES



PLANKS  
(can switch between hands and elbows)



PLANK TWISTS



## Cross-training and Running

- CORE EXERCISES



SIDE PLANKS



REVERSE PLANKS

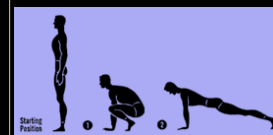


PUSH-UPS ON BALL



## Cross-training and Running

- ENDURANCE



SQUAT THRUST



BURPIE



## Cross-training and Running

- ENDURANCE



MOUNTAIN CLIMBER



## Cross-training and Running

- ENDURANCE
  - High knee jog in place
  - Jumping jacks
  - Jump rope



## Cross-training and Running

- THE CIRCUIT
  - 3 sets
  - 4 exercises in each
  - 5 minute warm-up and cool-down

3 4 5



## Cross-training and Running

- CORE FOCUS
- 5 MINUTE CARDIO WARM-UP
  - SET 1
    - Plank push-ups (fatigue)
    - Fast squats (1 minute)
    - Bicycle crunches (1 minute)
    - Jumping jacks (1 minute)
    - (30 sec rest)
  - SET 2
    - Jump Lunges (fatigue)
    - Side planks (30 sec each side)
    - Uphill run (1 minute)
    - Weight ball toe touch (fatigue)
    - (30 sec rest)
  - SET 3
    - Mountain climbers (1 minute)
    - Step ups (1 minute)
    - Reverse planks (1 minute)
    - Push-ups on ball (fatigue)
- 5 MINUTE CARDIO COOL-DOWN



Thank You

