# TRX, Exer-Gaming, Crossfit, and Boot Camps Effectiveness as Rehabilitation/Reconditioning Tools

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## Objectives

- Evidence based versus anecdotal evidence in various rehab and reconditioning tools
- Evidence for tools currently being used in reconditioning
- Future of alternative methods of training/reconditioning

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## Evidenced based practice

PICO
- Population/Patient problem
- Intervention (Treatment, Therapy, meds etc.)
- Comparison
- Outcome

PICOT
- Population
- Intervention (product)
- Comparison
- Outcomes
- Time

http://www.usc.edu/hsc/ebnet/ebframe/PICO.htm

- English, KL. Amonette, WE. Graham, M. Spiering, BA. What is "Evidence-Based" Strength and Conditioning? Strength & Conditioning Journal: June 2012 - Volume 34 - Issue 3 - p 19–24

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## Evidenced based practice

- "Best evidence"
- Systematic approach based on evidence professional experience/reasoning and patient preference

- "Anecdotal evidence"
- Positive outcomes product/treatment claims

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## Trends and tools

- TRX or Suspension training
- CrossFit training
- Boot camp training
- Exergaming
- Kettle bells
- Vibration/Acceleration training

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## Suspension Training/TRX

- Body weight exercise that load/unload movements to meet individual needs and goals (TRX Foundations and Applications )
- "Suspension Training"

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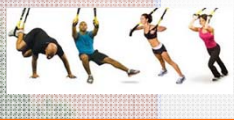
## Suspension Training/TRX

Claims:

- Easy to use & portable
- Multi-planer, wide ROM, low to high loads, partial weight bearing
- Stability training/ postural training
- Stretching and strength training



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## Suspension Training/TRX

- Anecdotal evidence
  - Various users claim that it increases postural stability, strength and balance.
  - Improves functional outcomes from the various training stances

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## Suspension Training/TRX

- Evidence:
- Increase: Growth hormone, Testosterone. Decrease Cortisol, after 60 min workout with a ratio of 30 sec work: 60 sec rest
- Increase in lactate and HR response after the same 30:60 ratio
- Increase activation of lats and abs versus regular push ups
  - Dudgeon and colleagues 2010-2011

*(4 abstracts same study)

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## Suspension Training/TRX

- Evidence:
- Increase in Abdominal and Latissimus Dorsi activation in suspension push ups compared to regular push ups.
  - Beach et al. 2008
- Increase in muscle generated stiffness from suspended rows compared to bent over rows, or single arm cable rows.
  - Fenwick et al. 2009

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## Suspension Training/TRX

- Suggested applications
  - Core stabilization
  - Resistance training
  - Flexibility/ ROM

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## CrossFit/Boot camp training

- CrossFit:
- Combination of strength training, explosive plyometrics, speed training with Olympic and power weight lifting:
  - WebMD

- Boot camps:
- Outdoor, group exercise that mixes traditional calisthenics and body weight exercises with interval training and strength training
  - Sports medicine.about.com
- Sometimes obstacles mixed with strength elements, as well as flexibility or even Yoga

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## CrossFit/Boot camp training

- True evidenced based research on these is minimal

## CrossFit/ Boot camp training

- Falls in line with traditional circuit and interval training.
- HIIT or High-Intensity Interval Training
- More specifically HIPT or High- Intensity Power Training*

*Smith et al. 2013 Epub JSCR

## CrossFit / Boot camp training

- High intensity training evidence
  - Reduce subcutaneous fat
    - Boutcher 2011
  - Increases in HDL, VO2, Fat oxidation, caloric burn
    - Shiraev 2012 , O'Hara et al 2012
  - Increases power
    - Astorino et al. 2012
- Circuit training
  - Increase strength and power
    - Chtara et al 2008

## CrossFit / Boot camp training

- Evidence:
  - Increase in VO2 Max
  - Decrease in Body Comp
    - Smith et al. 2013 Epub JSCR

- Evidence:(2013 ACSM abstracts)
  - Increased EE HR and RPE per minute versus jogging
    - McKenzie et al 2013
  - Increased pull ups
    - Schafer et al 2013*
  - No difference between resistance training
    - Arnett et al 2013*

* same study

## CrossFit

- Negatives:
  - Smith et al. reported that 16 percent of the original population dropped out of study because of injury

## CrossFit / Boot camp training

- Applications
  - Resistance training to improve strength and power
  - Cardiovascular improvements with circuit training
  - Body composition changes

## Exergaming

- Active gaming or exergaming –
  - Any game that uses the game system and remotes to move the person.
  - For example, active gaming would include Wii Boxing or Wii Fit,


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## Exergaming

- Claims: (Cardio)
  - Active gaming can improve a variety of fitness outcomes (HR, BP, body comp etc.) while being fun and entertaining

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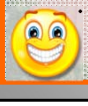
## Exergaming

- Evidence: (Cardio)
  - Success with stroke patient motor control
    - Saponski et al. 2012
  - Increased RPE and Max VO2, with advanced game level.
    - Whorley et al. 2011
  - Equivalent to walking or light activity
    - Maddison et al 2007
  - Whole body = best energy expenditure
    - Graf et al. 2008, 2009
  - Increase in HR in some games
    - Kraft et al. 2010



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## Exergaming

- Evidence: (Cardio)
  - Only one-third games tested led to MET of 3-6
    - Miyachi et al. 2010
  - Not enough intensity to get HR to target zone
    - Graves et al. 2010

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## Exergaming

- Evidence: (balance)
- Valid center of pressure data –
  - Clark et al 2010,2011
- Improve posture and stability
  - Doughtery et al. 2011, Nitz et al. 2010
- Improvements equal to traditional balance activities
- Brumels et al. 2008, Fitzgerald et al. 2012

- Evidence: (balance)
- Balance and posture, validity poor
  - Wikstrom 2012

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## Exergaming

- Application:
  - Use as warm up/ cool down
  - Use for sedentary or un-active
  - Variation from traditional exercise

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## Kettlebells

- Cannon-shaped, Iron ball with a handle
- Used for ballistic and off center movement training with high muscle forces


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## Kettlebells

- Claims to improve:
  - Muscle strength, power and cardio fitness.

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## Kettle Bells

- Anecdotal
- Increases reactive strength, explosive power and aerobic power as well as stability. – Acefitness.org/getfit

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## Kettlebells

- Evidence of proof:
  - Increased in strength in trunk extension (squat and single arm swings. Showed a decrease in pain
    - Jay et al 2011
  - Increase in maximal and explosive strength after 6 weeks (KB swings)
    - Lake and Lauder 2012
  - Increase in strength and power similar to Olympic lifts
    - Manocchia et al 2010
  - Increase strength but not greater than regular weight training after 6 weeks (accelerate swings and squats)
    - Otto et al. 2012

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## Kettle Bells

- Applications:
  - Increases in strength and ROM
  - Warm up
  - Power development in functional capacities

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## Acceleration Training

AKA Power Plate

- Acceleration Training:
  - Mechanical stimulus that uses oscillatory motion to improve physical performance (strength etc.)
    - Bollock et al. 2008, Cardinale and Wakeling 2005

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## Acceleration Training

- Claims:
  - CNS and KC benefits via activation of reflex pathways and circulation and secretion of hormones via muscle contraction/relaxation in all muscles at once
    - van deer Meer et al 2007

## Acceleration Training

- Anecdotal evidence:
  - Increases gravitational effects on body, to reduce atrophy and bone lose in zero gravity.
  - Increase feeling of workout.

## Acceleration Training

- Evidence of support:
  - Whole Body Vibration(WBV) for sarcopenia and osteoporosis
    - Cardinale and Wakeling 2005
  - Increase in 1 RM in squat training early in training
    - Lamont et al 2011
  - Increase in transient effects on jump height and balance
    - Torvinen et al 2002

## Acceleration Training

- Evidence of support:
  - WBV no effect on velocity jump height or acceleration unless it was a done a second time after a max jump and sprint sequence.
    - Bullock et al 2008
  - Review of 9 RCT showed that there was a moderate increase in jump height with WBV
    - Manimmanakorn et al 2010
  - Resistance training while on the vibration platform increases muscle fiber recruitment
    - Mason 2011

## Acceleration Training

- Application
- Can be used as an addition to or variation of resistance or strength training
- Squats or other exercise while on the plate

## Thank you

- Questions?


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