Exercise...

The next best thing to a Time Machine
TODAY

• What our muscles do for us
• What are the benefits of RT
• What are the risks
• Recommendations and Guidelines
• Samples
Meet Olga Kotelko...
AGE IS A NUMBER

NOT AN IDENTITY!
RESISTANCE TRAINING

What our muscles do for us

HOW TO START

WHAT RESISTANCE TRAINING DOES
What our muscles do for us
What do our muscles do for us?

Help us move (Produce ALL voluntary movement)
Maintain posture
Stabilize our joints
Generate Body Heat
WHAT DO OUR MUSCLES DO FOR US?

WHY ARE MUSCLES SO IMPORTANT?

Critical to Joint health, less stress
Posture and Symmetry. Less Stress on Connective tissue
Ability to perform ADL and keep independence
Diabetes and insulin sensitivity every 72hrs. Mod-Vig more effective
Helps with fat loss and metabolism. Upgrade your engine
Makes movement less fatiguing and more enjoyable
More confidence to move safely
Fall Prevention and Fall Resilience
WHAT RESISTANCE TRAINING DOES
Interested in how to be like Olga?

First Key is Strength

Leads us to Resistance Training
Can you reverse the clock?

[18]

RT can increase even in advanced ages

Muscle Mass

Power

Strength (from 25% to more than 100%)

Efficiency

Muscle Metabolism (blood sugar regulation)
A two- to threefold increase in strength can be accomplished in three to four months.

With ongoing strength training, increase in muscle size is also possible.
Benefits of Resistance Training

Reduce depression, anxiety, stress and improve mood \[3,4,14]\n
Increase insulin sensitivity for the next \[3,4,14]\n
Lower blood pressure and improve lipid profile \[11,12,14]\n
Prevent and/or delay osteoporosis
BENEFITS TO BONE

Pull of muscles on bone strengthens the bone.

Changes in direction even better ex. Tennis, line dancing, gardening and digging as well.

Compressive forces of weights No more ankle wts -Vests
RISKS OF RESISTANCE TRAINING

For those with severe untreated high BP 180/110 get treatment before

Even treated high BP, avoid very heavy weights and holding breath
RISKS OF PHYSICAL ACTIVITY
ACSM Position on Medical Exam and Stress Test before physical activity over 50

**Apparently healthy individuals**
- No chronic disease and
- No more than 1 CHD risk factor

**Higher risk individuals**
- Two or more CHD risk factors.
- With or without symptoms

Individuals with chronic disease
- CV, lung or metabolic disease

- Smoker
- High CHO
- High BP
- Diabetes
- Obesity
- Sedentary

CHD Risk Factors
RECOMMENDED FOR A MEDICAL EXAM AND STRESS TEST FOR THOSE OVER 50

<table>
<thead>
<tr>
<th>Type of Activity</th>
<th>Apparently Health</th>
<th>Higher Risk No Symptoms</th>
<th>Higher Risk W/ Symptoms</th>
<th>With Chronic Disease</th>
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</thead>
<tbody>
<tr>
<td>Moderate Exercise</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>Vigorous Exercise</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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RISKS OF PHYSICAL ACTIVITY

Study of 51,303 cardiac patients over 5yr period.

Of 2.3 million hours of exercise only 3 sudden cardiac deaths

We were meant to be active, sedentary lifestyle greater risk

Good judgement and common sense

Improper Technique, Excessive Load, inadequate rest, high impact
HOW TO START
First things first. To the women out there...

If you pick up a weight heavier than 3 lbs.

**LETS START!**

This will not happen to you!
DIFFERENCE BETWEEN STRENGTH AND POWER

Power is ability to produce as much force with as much speed

Don’t think you need that?

One of the major factors in maintaining independence [1]
Prevention of falls [2]
Muscular Power is lost before strength
Getting out of chair, going up steps, swinging golf club
Examples of Power Training
DIFFERENCE BETWEEN STRENGTH AND POWER

Strength is the amount of force applied to a given load

Going down stairs, picking up objects

Muscle strength peaks in mid 20’s and is relatively maintained into 60’s.

By 80’s strength is half of young adult
<table>
<thead>
<tr>
<th>Level</th>
<th>Duration</th>
<th>Reps</th>
<th>Sets</th>
<th>Load</th>
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<tbody>
<tr>
<td>JUST STARTING</td>
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<tr>
<td>Develop Basic Foundation up to 8 weeks</td>
<td>12-15 reps, 1-3 sets, low load</td>
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<tr>
<td>Intermediate Phase 8-24 weeks</td>
<td>10-12 reps, 1-3 sets, low to moderate load</td>
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<tr>
<td>Progress Further 6 months</td>
<td>on 8-12 reps, 1-3 sets, moderate to vigorous load</td>
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KEEP IT SIMPLE

Don’t overcomplicate it, start moving, go slow and gradually progress. Train backside more than front. 2:1, 3:1 ratio.

Work the muscles you can’t see.

More pulling movements for most population.

Years of working just the mirror muscles and/or bad posture imbalances set up for pain and reduced performance.
ARE MACHINES GOOD OR BAD

There is a place in the beginning

Doesn’t translate fixed linear path, supported

Greater risk to develop asymmetries
STARTING OUT

Warm up and Movement Prep
Just starting out include as part of workout
Increased blood flow to muscles, oxygenation and body temperature. (rubber band)

Warm up 4-5min. 30s of ~8-10 moves

At end should feel warm with elevated heart rate and breathing
STARTING OUT

To Stretch or Not to Stretch

Static vs Dynamic Movement Prep

Tissue Quality Work Foam Roll
Warm up and Movement Prep Example
ASSESSMENT & SCREEN

Value of: Baseline Norm and Proper Comparison

Lower Body Test 30s Chair sit

Upper Body Test 30s Arm Curl

Shoulder mobility screen
HOW TO BUILD WORKOUT

HIP DOMINANT
KNEE DOMINANT
PUSH
HEEL PULL
CORE (ANTI-EXTENSION, ANTI-ROTATION, ROTATIONAL)
BALANCE
WHAT IS YOUR CORE?

Core Work

What is it?

Critically important, prehab or rehab

Stop doing sit ups. 730lbs compression (Axler and McGill, 1997)

How to train effectively- Anti-extension, Anti-rotation in neutral position
CORE EXERCISE EXAMPLES

Anti Extension
Anti-Rotation
Rotation in Neutral position
Anti-Flexion
EXAMPLE 1 BEGINNING

WORKOUT EXAMPLE 1

Tubing Rows
Side step outs
Single arm cable row
Forward and Back Steps
Sit to stand (can elevate, and load) Resistance
Standing leg curl or ball curl
Standing hip ext
Heel raises then toe raises

Strength Rx
2 - 3 days per week
Moderate Intensity
8 - 10 Exercises
Major Muscle Groups
1 - 3 sets of 8 - 12 repetitions
EXAMPLE 2 GREATER CHALLENGE

WORKOUT EXAMPLE 2

DB Row
Shuttle Press
Diagonal Back Hand
Step Ups
Sled Push
Cable Bracing Push-Out
Split Stance Single Chest Press
Tubing Diagonal Lift

Strength Rx
2 - 3 days per week
Moderate Intensity
8 - 10 Exercises
Major Muscle Groups
1 - 3 sets of 8 - 12 repetitions
VARIETY AND GRADUAL PROGRESSIVE OVERLOAD

Stuck doing the same routine and weights

Should progressive gradually over time as body adapts

Fourth grade math book

Stress and adaptation
STRENGTH VS FUNCTION

Need Strength to help function
However Stronger doesn’t equal direct function improvement

Specificity to the task
FUNCTIONAL AGING MODEL

Train all Components of Function
Be purposeful
Train in all 3 planes of motion (Sagittal, Frontal, Transverse)
Movements before Muscles
Stand up and Stay up as much as possible
Complicated first moving to simple as you fatigue
Stay Safe. Nothing should hurt. Work vs Pain
RESISTANCE TRAINING AND OSTEOARTHRITIS

The chicken or the egg? Strength decline in OA due to drop in activity

Evidence Muscle weakness directly contributes to development and progression of OA

Strength training has significant benefit in improving function and reducing OA pain
Investigation of Resistance Training on OA

Study of 102 adults with mild to moderate Knee OA

Group 1 Higher Intensity: 3 sets of 8 at 80% of 1 RM
7/10 reported pain. Moved to 60% of 1 RM

Group 2 Lower Intensity: 10 sets of 15 reps at 10% of 1 RM

After 8 weeks both exercise groups “significantly” reduced pain & improved function over control. No adverse effects reported. Better in High Resistance but not statistically significant between low and high.
RESISTANCE TRAINING AND OSTEOARTHRITIS

Very large effect on strength in non OA group but minimal effect on Function

In OA groups moderate effect on Strength, Function and Pain almost identical across all three

“When older people with OA participate in strength training the training directly targets one of the main barriers to their functional performance.”
“The positive message from this review that should be clearly communicated to older people with OA is that no matter how old they are, they will probably benefit in clinically important ways from participating in a strength training program, as long as it provides some consistent overload to their muscles as they exercise.”

“The biggest challenge with any exercise program is to maintain long-term adherence, because the benefits of exercise will diminish if people stop exercising.”

Nancy Latham, PhD, PT
Boston University School of Public Health
TIPS FOR EXERCISING WITH OSTEOARTHRITIS

Identify when is the best time of day for you

Change methods, angles, frequency, resistance level, body position

High and Low Intensity study both effective 8wks [9]

Dynamic and Isometric both effective 16 wks [10]
TIPS FOR EXERCISING WITH OSTEOARTHRITIS

• **Move all Joints Daily**

• **Move inflamed joints gently through range of motion**

• **Begin with warm up of slow exercises**

• **Take warm shower just prior**

• **Slow Controlled movements no bouncing**

• **Attempt full range of motion to point of mild discomfort but not pain**

• **Listen to your body**

*Adapted from Arthritis Foundation (2009)*
Arthritis in hands - Claw
Joint replacements
Load patterns i.e. vertical vs horizontal
Severe deconditioning
THE STRENGTH, ENERGY AND POWER TO DO WHATEVER THE HECK YOU WANT
WHEREVER YOU START...
...YOU CAN MAKE IT LOOK RIDICULOUSLY EASY LATER
REMEMBER OLGA?


Melo, C.M., Alencar, F., Tinucci, T., et al.


