Exercise: The Surprising Links Between Your Brain and Body

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Exercise is Good For Us

We’ve heard it countless times

Our goal:
Give you cutting edge research on brain health and exercise
Practical advice to help you start today

Percentage of adults exercising at least 30 minutes/day, 5 days or more per week

<table>
<thead>
<tr>
<th>GENDER</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Women</td>
<td>25%</td>
</tr>
<tr>
<td>Men</td>
<td>29%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>AGE</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-30 years</td>
<td>27%</td>
</tr>
<tr>
<td>31-49 years</td>
<td>25%</td>
</tr>
<tr>
<td>50-64 years</td>
<td>28%</td>
</tr>
<tr>
<td>65+ years</td>
<td>31%</td>
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</table>
We are athletes
A little (pre)-history

• Context: We evolved as endurance athletes

• This is the first time in our history where sedentary living is the norm

Exercise: key to living longer?

8 year study of over 400,000 Taiwanese men and women

Wen et al., Lancet, 2011
Even With Other Risk Factors


\[ N = 6204 \text{ subjects} \]
Exercise Benefits are Systemic

Howe et al., 2011; Lanza et al., 2008; Miller et al., 2012; Mann et al., 2012
Why is Exercise Beneficial?

One Hypothesis: Byproduct effects

Produces compounds (proteins) to help you exercise

Primary:
- Turn food into energy
- Grow new blood vessels

Byproduct:
- Improves heart function
- Brings blood and nutrients to brain
Acute Exercise in Adults

Acute exercise increases Brain Derived Neurotrophic Factor (BDNF)

Also improves cognitive function

Griffin et al., 2011
What About Brain Aging?

Cutting edge research
Effects of Aging on Cognition

Cognitive abilities often affected by healthy aging, include:

- Executive functions, like shifting between tasks, planning activities, and ignoring irrelevant information
- Memory
- Speed

Does Moderate Exercise Improve Cognition?

Analysis of 18 studies show exercise training benefits for cognition in older adults for multiple cognitive domains, but especially for executive abilities.

Hillman et al., *Nature Reviews Neuroscience*, 2008
Healthy Aging Leads to Less Brain Volume

Alexander et al., NeuroReport, 2006; Bergfield et al., Neuroimage, 2010
Does Moderate Exercise Increase Brain Volume?

Healthy elderly adults randomly assigned to aerobic exercise for 6-months, 3 hrs/week had increased brain volume in gray matter (GM; blue) and white matter (WM; yellow) compared to a non-exercise group.

Aerobic Exercise Training Increases Brain Volume of Regions Important for Memory

Erickson et al., *Proc Natl Acad Sci USA*, 2011
Physical Fitness Increases Brain Activity During Cognitive Tasks

Healthy elderly with aerobic exercise training showed greater brain activity during a cognitive task compared to the untrained group.

Colcombe et al., *Proc Natl Acad Sci USA*, 2004
Applications for You

Evidence-based approach
Suggestions for daily life changes

• Think of exercise as medicine: make it a priority

• If starting from scratch, start small and work your way up (and chat with your doctor first)

Suggestions for daily life changes

Choose activities likely to provide the most benefits, while minimizing injury risk

Enjoyment is the KEY!

Suggestions for daily life changes

How to start? Small changes can add up to big results

Increasing stair use can improve aerobic fitness by 10%

Park farther away: Lifestyle change comparable to structured program in intervention study

Ross and McGuire et al., 2011; Meyer et al., 2010; Dunn et al., 1999
Suggestions for daily life changes

Set a movement goal and follow your progress

Start slowly and gradually increase activity to reach your goal: 10% increase in steps/week

Best evidence suggests ~2.5 hrs/week of moderate intensity
Suggestions for daily life changes

Work your way up to moderate intensity

<table>
<thead>
<tr>
<th>Age</th>
<th>Max. HR (220-Age)</th>
<th>Target HRs (60-70%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>65</td>
<td>155</td>
<td>93-109</td>
</tr>
<tr>
<td>70</td>
<td>150</td>
<td>90-105</td>
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<tr>
<td>75</td>
<td>145</td>
<td>87-102</td>
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<tr>
<td>80</td>
<td>140</td>
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<tr>
<td>85</td>
<td>135</td>
<td>81-95</td>
</tr>
<tr>
<td>90</td>
<td>130</td>
<td>78-91</td>
</tr>
</tbody>
</table>

American Heart Association Guidelines
Suggestions for daily life changes

Work your way up to moderate intensity

Light intensity:
Can talk and sing without problem
No change in breathing patterns

Moderate intensity:
Change in breathing, but not out of breath
Can talk, but not sing
Suggestions for daily life changes

Add strength and balance training: Fall prevention & osteoporosis

Focused strength and balance training can reduce risk of falls up to 50%

Kannus et al., *Lancet*, 2005
Suggestions for daily life changes

Ask a friend to take a walk or join a group exercise class/activity

Making exercise social improves adherence: 84% vs. 60% after 6 months

Cox et al., *Prev Med*, 2003
Start Today
Great! You’re on your way to a healthier you. Now keep the momentum going. What would you like to do next?

get READY
- How Exercise Can Help You
- 4 Types of Exercise
- Stay Safe
- Learn About Healthy Eating

get SET
- Find Your Starting Point
- Set Your Goals
- Make a Plan
- Common Questions

GO!
- Try These Exercises
- Track Your Activities
- Keep Going
- How Are You Doing?
National Institute on Aging at NIH: http://go4life.nia.nih.gov

Find Activities and Exercises Here

**STRENGTH EXERCISES**

- **Upper Body**
  - Hand Grip
  - Wrist Curl
  - Overhead Arm Raise
  - Front Arm Raise
  - Side Arm Raise
  - Arm Curl
  - Arm Curl with Resistance Band
  - Seated Row with Resistance Band
  - Wall Push-Up
  - Elbow Extension
  - Chair Dip

**BALANCE EXERCISES**

- Stand on One Foot
- Heel-to-Toe Walk
- Balance Walk
- Tai Chi

**FLEXIBILITY EXERCISES**

- Neck
- Shoulder
- Shoulder and Upper Arm
- Upper Body

*NOTE: Each of the lower-body strength exercises also helps to improve your balance.*
Local Programs

• Walk Across Arizona – UA Extension Service

• Mayor’s 100 mile challenge
  • Walk 100 miles by June 2013

• Better Than Ever- UA Cancer Center
  – Walking
  – All ages

• Silver Sneakers
Summary

• We are all athletes and exercise is good for us

• Exercise can enhance our health

• Aerobic exercise can benefit cognition and brain aging

• Don’t wait, get started!
Thank You Supporters…
Cited References

- Dunn AL, Marcus BH, Kampert JB, Garcia ME, Kohl HW, Blair SN. Comparison of lifestyles and structured interventions to increase physical activity and cardiopulmonary fitness: A randomized trial. JAMA, 1999, 281, 327-34.
Cited References (cont.)

- Mann N, Rosenzweig A. Can Exercise Teach Us How to Treat Heart Disease? Circulation, 2012, 126, 2625-35.