Evidence-based

Healthy Lifestyles to Lower Risk and Slow the Progression of Alzheimer's Disease

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January 20, 2005

Introduction:

- With the aging of the Baby Boomer population, the number of persons affected with this disease is expected to **increase significantly**.
- Alzheimer's disease already impacts **millions** of people and their families in Europe, America, around the world.
- The research paradigm is rapidly shifting towards recognition of AD as a chronic disease, whose prevention and management parallels that of other chronic diseases.
- Like other chronic diseases, AD is complex with **many environmental and genetic factors.**
- AD is dramatically affected by what is going on in the rest of the body especially the cardio-vascular system.

Take-Home Message Today

- There are things WE can do to in the area of HEALTHY LIFESTYLES that will not only improve quality of life of people with AD, help them feel and function better, and also perhaps delay progression.
- Similar measures will reduce the risk or delay onset of others, including our families and OURSELVES! whatever the personal risk factors for AD.
- To reduce one's risk of AD, lifestyle changes are probably more important than any pharmacological intervention.
- Lifestyle changes, added to medical treatments, can probably help slow progression, even in those who already have AD.
- We are talking risk reduction and slowing progression, NOT absolute prevention or cure.
- If we can delay onset by 5 years, we cut prevalence of AD in half. Improving quality of life is our goal.

Alzheimer Association's Maintain Your Brain Campaign and our BE☯ WELL and BEST Programs

- Our team's work has been going on for 6 years, inspired by the Amsterdam AD Research Conference in 1998 and Professor Xiu Wen Zhang's Suggestions that fall based on Chinese Medicine.
- Dr. Lynn Lazarus Serper's professional work emphasizing cognitive rehabilitation for brain injury & AD went public about the same time. We have joined efforts to test her intervention for persons with AD in the BEST study funded through BU School of Medicine.
- Terrific that the U.S. Alzheimer's Association is leading a public health campaign to encourage people to promote and maintain brain health: called Maintain Your Brain.
  - Creating a national educational program that will be implemented near year end. Massachusetts chapter staff got trained this past weekend!
  - Go to their website: alz.org for more information. Very much along the lines of our program and recommendations.

Why We Need Public Health Awareness NOW

- Gold standard double blind clinical trial proof of preventive power of lifestyle changes will probably take too many years to save the baby boomer generation. They are of course important to pursue and do.
- Mounting evidence is supportive of lifestyle approaches.
- We need to move forward NOW to preserve brain health and to save lives.
- Downside risk is we motivate people to make changes that improve other chronic diseases
- Other similar multi-factor programs developed as evidence explodes
  - American Society of Aging's Mind Alert Program-started in 2000
  - Gary Small MD, PhD at UCLA
  - Paul Nussbaum PhD at University of Pittsburgh

Brain Basics

- Weighs about 3 pounds yet uses 20%□2□% calories.
- 25% of the blood from every heartbeat goes to the brain; brain uses 20-25% of oxygen.
- Blood brings nutrients (glucose) and oxygen & removes toxins.
- Composed primarily of fat, matters **which** fats.
  - Brain structure and function dependent on PUFAs and proper ratio of n-6's to n'3's. Should be 1:1 or 4:1. Typical western diet: 20-30:1
  - PUFAs comprise cell membrane, myelin sheath, blood vessels, and ratio affects viscosity of blood, and function of neurotransmitters.
  - Omega 3 "DHA" (22:6N-3) is key to cerebral cortex, mitochond□ia, synapses and retinal photoreceptors.
  - PUFAs especially DHA very vulnerable to oxidation

Remember

- Whatever hurts heart and blood vessels harm the brain.
- Problems with glucose metabolism threaten the brain.

BE☯ WELL's Elements are:

- **Nutrition**
- **Physical Exercise**
- **Cognitive and Mental Stimulation & Rehabilitation**
- **Management of Stress and Depression**
- **Social Support/Interaction**
- **Interventions to balance Qui (Acupuncture, Acupressure, Tai Chi, Qui Gong)**

BE☯WELL program integrates multiple, promising, research-based approaches. We hypothesize **BE☯WELL** will reduce risk and delay onset of AD and may also slow progression.

Each Vascular Risk Factor Also Adds Risk for AD & Severity of Dementia:

- Nun Study : Elderly nuns functioning cognitively normal found to have extensive AD plaques and tangles. Key factor: degree of vascular disease. (Snowdon et al 1997 JAMA)
- Strokes: (Vermeer, 2003, (Honig/Mayeux, 2003, Archives Neurology)
- Diabetes: Leibson 1997; Ott/Rotterdam Study 1996; Peila(Honolulu-Asia Aging Study-HAAS) 2002; Honig/Mayeux (Columbia) 2004.
- High blood pressure: Launer (HAAS) 2000; Petrovitch (HAAS) 2000
- Smoking: Tyas 2003.
- High cholesterol: Refolo 2002.
- Inflammation: Schmidt (HAAS) 2002; Shalit 1994; Kalman 1997.
- High Homocysteine levels: Nilsson 2002.

Manage Heart Health Numbers for Brain Health

Brain health requires controlling:

- Weight/BMI
- Blood pressure: systolic- less than 120 for women & 130 for men.
- Blood sugar (fasting blood sugar normal is less than 100 mg/dL; 100-125 mg/dL is borderline diabetes)
- Trigylcerides at 40-70,
- Cholesterol Desireable: Total 160-200 & HDL over 35 & LDL under 130.

- Go to www.alz.org for more information

Lessons so far:

- Chinese and other ancient medicines' holistic view that our major organs are all interconnected holds true for the brain.
- We need to manage our numbers (and encourage those we care for): keep weight, blood pressure, triglycerides, blood sugar and cholesterol within normal ranges.

(Alzheimer's Association Maintain Your Brain initiative)

Blend of the East and West, Old and New

- We are returning to ancient knowledge with new understanding and scientific study
- As far back as the ancient Greeks, and birth of Western Medicine, Hippocrates said “food is medicine, and your best medicine is food.” Other ancient cultures knew this: e.g. Chinese and Indian.

We Can Reverse Heart Disease and Prevent Diabetes with Lifestyle Changes

- Large prevention trials in USA, China, and Finland show moderate reduction in weight and half-hour of walking each day cut incidence of diabetes **in half** for overweight subjects with mild glucose intolerance. (Finnish Diabetes Prevention Study Group, 2001).
- We can help prevent occurrence of coronary heart disease through diet and lifestyle (primary prevention). (Stampfer 2000).
- Intensive lifestyle change interventions (10% fat whole foods vegetarian diet, aerobic exercise, stress management, smoking cessation, group support) reversed heart disease in a long term small cohort clinical study. (Ornish, 1998).
- Mediterranean Diet effective in secondary prevention of coronary heart disease; reduces risk of recurrent heart attacks-Lyons France Heart Study: de Lorgeril et al., 1994 & 1999 & Kris-Etherton,2001).
- Fish, Omega-3s and Vitamin E are especially helpful in secondary prevention of CHD. (GISSI-Preventione Investigators 1999)

For More Complete Evidence

- Contact us for additional slides summarizing evidence upon which our memory diet is based.
- The next study reflects the growing body of evidence…what is unusual about this study is that it puts together several components envisioned in the BEWELL program.

Dog Study Shows Us the Way: Healthy Lifestyles Protect Brain Health

- 2-year study
- Dogs ages 7 to 11 years (an age when most dogs fed usual dog food start to fail cognitively) performed better on cognitive tests and were more likely to learn new tasks
  - when fed a diet fortified with fruits, vegetables and vitamins,
  - got exercise at least twice a week which included playing with other dogs and stimulating toys.
- 42 older beagles were divided into four groups.
  - One received standard care and diet;
  - another just got dog food fortified with vegetables and citrus pulp, and vitamins E and C supplements;
  - a third just received extra exercise and social play,
  - and a fourth got both the improved diet and exercise-play routine.

Beagles Show Us the Way: More is Better

- Results:
- Only two of the eight in the control group were able to solve the reversed learning problem
- Eight of the 12 on the enhanced diet alone and Eight of the 10 on the exercise-play routine were able to solve the learning problem.
- All 12 dogs getting the combined diet and exercise program were able to solve the problem.
- Conclusion: Each (intervention) factor alone was capable of improving cognitive function in older animals, the combination was additive, pointing to a healthy lifestyle as the most beneficial approach.

Dog Study Shows Us the Way: Healthy Lifestyles Protect Brain Health

- "The combination of an antioxidant diet and lots of cognitive stimulation - which was almost the equivalent of going to school every day - really did improve brain function in these animals," said Elizabeth Head at the University of California-Irvine.
- "We're excited about these findings because the interventions themselves are relatively simple and might be easily translated into clinical practice for people.“
- Fruits and vegetables added to the food was equal to increasing the human daily intake from three servings to five or six,
  - a formula guided by other studies that show antioxidants can reduce age-related damage to the brain.

The 5 Leg's of Memory Preservation Nutrition:

- **Anti-oxidants: increase amount and variety**
- **Omega-3's: increase amount of n-3's and ratio of n-3's to n-6's.**
- **Folate and B-vitamins: ensure sufficiency**
- **Prevent/Reduce Insulin Resistance and hyper-insulinemia; maintain glucose balance.**
  - **Emphasize low glycemic index foods. Limit consumption of high glycemic foods to when needed for important nutrients or when consumed with oils. Use spices (cinnamon, allspice, bayleaf, nutmeg, cloves, sage, basil) and other nutrients (green & black tea, mushrooms, brewer's yeast) shown to increase insulin sensitivity**
- **Reduce inflammation**

Memory Preservation Nutrition: Additional Principles

- Balanced diet is essential.
- Get most nutrients from whole foods or juices;
- Supplements are extra insurance.
- Several common spices appear to be protective: e.g. ginger, rosemary, thyme, tumeric/curcumin, oregano, onion and garlic. Some are anti-inflammatory, some rich in antioxidants e.g. flavanoids & polyphenolics, some increase insulin sensitivity, some do all three. Many also have heart/brain healthy attributes. Allicin, the main ingredient in crushed garlic, when consumed in large quantities, reduces cholesterol and blood pressure.
- For food sources, see handout or email us.

Nutrition for Early Alzheimer's Disease/ Memory Preservation Diet ©2004

1) Emphasize low glycemic index foods. Limit consumption of high glycemic foods to when needed for important nutrients or when consumed with oils.
2) Blueberries or other berries or cherries, one cup a day.
3) 8 oz of fruit juice, e.g. orange juice, high in vitamin C and folates
4) 8 oz of low-sodium vegetable juice daily.
5) 2 additional fruits and 2 additional vegetables every day including one green leafy.
6) Fish at least three times a week, ideally fish or other seafood 3-5 times a week.
7) Nuts, a small handful (50 grams) daily, ideally alternating almonds and either walnuts or pecans.
8) Green tea or, black tea , at least one cup daily;
9) Increase B-vitamins and folates.

10) Minimize red meats, saturated fats & fatty dairy foods. Avoid trans-fatty acids. Eat healthy fats: omega 3's (e.g. canola oil) & mono-unsaturated (e.g. olive oil). Avoid N-6 oils.

11) Emphasize complex carbohydrates, and fish/seafood, poultry, & vegetable (including beans & soy), seeds, nuts as sources of protein

11a) Avoid simple sugars & refined carbs.

12) Include spices & nutrients shown to increase insulin sensitivity, improve glucose metabolism: **spices (cinnamon, allspice, bayleaf, nutmeg, cloves, sage, basil) and other nutrients (green & black tea, mushrooms, brewer's yeast). Most strong anti-oxidants.**

13) Increase ratio of Omega-3 PUFAs to Omega-6 PUFAs.

14) 4-6 glasses of water every day as needed to supplement other fluid intake to total at least 8 cups/day

15) Fish Oil or Flax Seed capsules; two 1000 mg soft gels a day, with 450 mg of omega-3 fatty acids.

16) Multivitamins with 300% or more of RDAs for vitamins C, all B vitamins including thiamine, riboflavin, niacin; 200 mcg folate; 400 IU of natural form vitamin E including alpha, delta & gamma tocopherols. Sufficient vit D, calcium

Physical Exercise

- Exercise helps blood flow to the brain.
- Exercise increases metabolic capacity (McCloskey, 2001).
- Mice with voluntary physical activity (wheel running) and environmental enrichment doubled the total number of surviving newborn cells in the dentate gyrus and hippocampus. (van Praag Kempermann and Gage, 1999, Tanzi, 2000).
- Positive association between oxygen consumption & cognitive function in healthy elderly & people w.AD (Barnes, 2002; Palleschi, 1996).
- Aerobic fitness reduces brain tissue loss in aging humans (Colcombe, 2003).

Physical Exercise

- Physical activity is associated with lower risk cognitive impairment, AD, & all dementias (Laurin, 2001).
- Tai Chi is beneficial to cardio respiratory function, immune capacity, mental control, flexibility, balance, health perceptions, mood, and well-being (Li, 2001).
- Physical Exercise intervention for AD patients
  - care partner served as "trainer,"
  - improved ADL function, depression and quality of life
  - improvements in exercise level & results maintained for years.

  (Teri, JAMA, 2003).

Cognitive Stimulation & Rehabilitation

Animal Studies

- Learning stimulates an increase of new brain cells in macaque monkeys (Gould, Gross, 1998).
- Learning promotes neural strength and new neural connections (Gould, 1999; Shors, 2001, Van-Praag, 2002).
- Mice with both voluntary physical activity and environmental enrichment doubled the total number of surviving newborn cells in the dentate gyrus (Van-Praag, 1999).
- Rats with enriched experience developed greater weight and thickness of cortical tissue, longer and stronger dendrites, an increase in the amount of acetylcholine (Bennet, 1996).

Human Studies

- The adult human brain can also generate new neurons throughout life –true for all mammalian species. New cells must be used to live & become integrated in brain. (Van-Praag, Kempermann and Gage, Nature, 2000; Eriksson and Gage, 1998, Nature).

Cognitive Interventions in Healthy Elderly Improve Cognition

- Learning certain memory strategies improved short-term memory in healthy elderly (Valenzuela, 2002).
- ACTIVE trial showed positive results for short-term interventions with elderly in improving memory and other aspects of cognition (Ball, 2002).

ACTIVE Trial with Healthy Older Adults

- Volunteer sample of 2832 persons
- aged 65 to 94,
- randomly assigned to 1 of 4 groups:
- 10-session group training for memory, reasoning, speed of processing, or a control group.
- Each intervention improved the targeted cognitive ability compared with baseline, durable to 2 years

Challenging Your Mind Lowers Risk of Developing AD

The “use it” or “lose it” phenomenon:

- Twin’s comparative reports suggested that intellectual involvement in earlier lives was associated with less risk of developing dementia (Gatz, 2001).
- People who participated in mentally challenging activities had a lower risk of AD and reduced decline in global cognition (Wilson, 2002).

Mental Stimulation & Cognitive Rehab helps persons with AD

- For persons with AD, playing bingo, cognitive training therapies, and psycho-education all helped improve memory, cognition, and daily functioning. (Sobel, 2001; Ballarini, 2002; Avila, 2002 and Emmerson, 2002).

Cognitive Rehab (CR) Helps AD Patients Learn (David Lowenstein, U.Miami, AJGP July 04)

- Multiple component in-office 3-4 month 2x/week program with 25 targeted CR & comparison: 19 Mental Stimulation (MS); home practice; all on cholinesterase inhibitors, MMSE of 18 plus.
- Targeted Interventions That Worked :
  - 170% improvement in ability to recall faces and names-(recognition techniques)
  - 71 % improvement in ability to provide proper change for purchase
  - Improved response and processing time (clicking a mouse button in response to yellow boxes on computer screen)
  - Better oriented to time and place (appointment book, medication scheduler; contact info)
  - Improvements maintained 3 months after CR ended
- Interventions that Did NOT Work:
  - Using a calculator to balance checkbook after paying 3 bills
  - Manipulating common objects as if using them
- Comparison intervention of mental stimulation of playing computer games, word scrambles, puzzles did not impact target skills (may have improved other skills not measured).

Brain Enhancement Strengthening Treatment (BEST)

To create a mentally enriched environment for AD patients, the Boston University School of Medicine's **BEST** Study Program targets multiple areas of thinking:

- Memory Strategies and Aids
- Social Skills
- Mind Stimulation
- Cognitive Training and Rehab
- Applied to Topics of Personal Interest

(Emerson Lombardo, Lazarus Serper, Drebing et al.)

The BEST Prescription includes daily strategies for:

- Reading e.g. the newspaper
- Writing and abstracting
- Basic math exercises
- History matching
- Working on puzzles and word tasks
- Attending lectures, movies, concerts, and plays; engaging in conversation

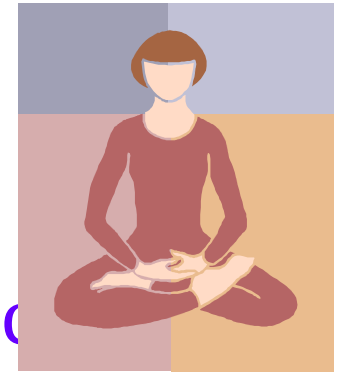
Swedish Studies Highlight Which Activities Help Protect Us

- Kungsholem prospective cohort study reports physical fitness and social activities, productive activities, social network, mental activities and memberships are all independently related to lower risk of dementia (Fratiglioni, 2002)
- Laura Fratiglioni did a META-ANALYSIS of epidemiological studies and concluded that complex activities e.g those that involve physical activity and social interaction as well as cognitive challenge, are the best! (Fratiglioni, 2004) (Remember the mice!) Examples: golf, dancing

Social Support/Interaction

- Community dwelling elderly persons with fewer social ties and less social interactions are at increased risk for cognitive decline and dementia (Bussuk, 1999; Fratiglioni, 2000; Amne, 2002).
- Emotional support, sports activities, cultural activities, and having confidants seem to be protective factors for AD (Wang, 2002; Bernhardt, 2002).
- Recent research at Tufts University found that older persons who keep their brain intellectually active and participate in social activities are 38% less likely to develop dementia.

Management of Stress & Depression



- Stress and depression appears to be assoc with elevated risk for AD (Kalyn 2002; Du, 2002; Wetherell, 1999).
- Relaxation and stress-management is associated with reduction in blood pressure and possible reduction in coronary heart disease risk & improved QOL (Patel, et al. 1987).
- Stress-reduction therapies, such as art therapy, improved cognitive function, sociability, calmness, and mental acuity in people with dementia (Kimura, 2002; Rusted, 2002).

Management of Stress & Depression

- Omega-3's shown in RCTs to be effectiv treating depression and anxiety in people. Essential to a healthy brain. (Andrew L. Stoll "The Omega-3 Connection" 2001; (Colin et al., 2003) .
- Reducing insulin resistance may help reduce depression & anxiety and help prevent AD. (Jarvik, 2004).
- NOTE again the interrelatedness of America's most common chronic diseases and help that might come from better lifestyles such as improved nutrition and more physical exercise.
- No surprise…maybe today's scientists are rediscovering and "proving" ancient wisdom.

Traditional Chinese Medicine

- Western science is suggesting a holistic approach is relevant to brain health
- TCM includes food, herbs, exercise, mental stimulation, mind/body work and keeping Chi in balance and flowing.
- Chi is life force or energy

Enhancing and Maintaining Chi

Several methods...all help reduce stress as well as heal specific conditions

- Acupuncture
- Exercise (Qi gong and tai chi)
  - Standing meditation, can be static or active
- Acupressure
- Breathing and meditation
- Yoga is good method from another ancient traditional medicine- Indian medicine.

Behavior change

- So now you have some evidence about how lifestyle can improve brain health
- We have known about the benefits of exercise and eating healthy for
  - Heart disease, stroke, diabetes
  - And more recently, for depression & bone density
- NOW we know it's good for our brain!!
- The question is…will THAT get us to actually change our habits, to exercise more and watch what we eat? How do we help others do it?

Where Do We start?

- We are social animals: Link friends to walk or “think food”, dance or play cognitive games with.
- Create groups of people who are interested in healthy lifestyle.
- Use a pedometer to motivate more walking!
- Get your Council on Aging, AD or other support groups involved.
- Create more opportunities for exercise, tai chi, yoga or nutrition classes or discussion/motivational/how to groups.
- Create more lifestyle oriented activities for seniors.
- Strategize ways to use your brain, and help others use theirs, in new ways every day…new pathways to brain health!
- Learn more about the Alzheimer’s Association Maintain Your Brain program and keep abreast of the latest research that can help guide us. Go to **www.alz.org** for more information

How to contact us

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