Dance Your Way to Health!

Jill R. Baron, MD, MS, FAAFP, ABIHM, IFM, NCMP
Integrative and Functional Medicine
New York, New York
Visiting Attending, the Mount Sinai School of Medicine
Clinical Assistant Professor of Family Medicine, SUNY at Stony Brook
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Overall Goal of Talk

- This session will focus on the health and well-being benefits of dance, movement, and music, using evidence-based research and audience participation.
Learning Objectives:

- To show that dance, movement, and music can enhance the health and well-being of patients.
- To understand the use of dance as a therapeutic tool in patients with Parkinson’s disease, and other medical conditions.
- To demonstrate that dance can enhance healthy aging.
- To show that dance and movement can benefit children.
Why I Chose this topic

- Personal Experience of Music, Dance, Movement, Exercise
- Dance—alternative form of exercise for patients and us!
Exercise
Common Barriers to Exercise


- lack of time
- fear of falling
- self-conscious about appearance
- poor health
- bad weather
- lack of energy (exercise is too tiring)
- no exercise partner
- little support to exercise
- too weak to exercise
- no (adequate) workout facilities
Unfortunately, most people do not meet the minimum recommended amounts of physical activity

Dropout

~50% of novice exercisers drop out of physical activity programs within the first six months.

Before physiological gains occur.

ID Factors—starting and maintaining physical activity--one of the greatest challenges for exercise researchers.

Sedentary behavior

- The average American adult spends more than 50% of his/her waking hours in sedentary behavior.
- Associated with increased morbidity and mortality indep. of individual’s MVPa (moderate to vigorous intensity physical activity); even 2 hrs/day of MVPa
Sedentary Behavior and CV Risk

- Even with 2hrs/day of moderate physical activity sedentary behavior still correlated with all-cause mortality in a dose-dependent manner.
- Evidence is emerging that BREAKING UP sedentary time may be beneficial compared to uninterrupted sedentary time.

*Curr Cardiol Rep* (2016) 18:6
Sedentary Behavior and CV Risk

- Optimal sleep duration,
- less sedentary behavior time, and
- more time in active behaviors are associated with a reduced CVD risk profile.

- Curr Cardiol Rep (2016) 18:6
Sedentary Behavior and CV Risk

- Independent of moderate daily physical activity requirement
- No current US Guidelines
- The Canadian Sedentary Behaviour Guidelines from the Canadian Society for Exercise Physiology:
  1. limiting recreational screen time < 2hrs/day
  2. limiting “sedentary (motorized) transport, extended sitting, and time spent indoors” throughout the day.

*Curr Cardiol Rep* (2016) 18:6
Sedentary Behavior and CV Risk

- **Australia’s Sedentary Behaviour Guideline:** similarly recommends:
  1. minimizing the amount of time spent in prolonged sitting and
  2. breaking up long periods of sitting as often as possible.

- Until further evidence-based recommendations are available, it is reasonable to follow the above guidelines to the extent possible.

*Curr Cardiol Rep (2016) 18:6*
Strategies to Reduce Sedentary Behavior

 “Built Environment”
 Home/Workplace
 Local/National Community
 Individual/Family

Curr Cardiol Rep (2016) 18:6
Local/National Community
- Urban planning
- Transportation policies
- Sidewalks, bike paths, green spaces
- Safety for non-vehicle traffic
- Media portrayal of typical lifestyles
- Socioeconomic opportunities
- Development of mobile Health technology

Workplace/Home
- Activity-permissive workstations
- Employer-sponsored health promotion
- Building design
- Furniture design
- Neighborhood walkability
- Time-saving devices/appliances

Individual/Family
- Personal motivation or health status
- Biological factors
- Demographic factors
- Hobbies that involve physical activity
- Avoidance of screen-based activities
- Interest in technology (mHealth)
Strategies to Reduce Sedentary Behavior

“Mobile Health” = mHealth

- mHealth technologies help eliminate the inaccuracy of self-reported sedentary and physical activity time.
- Programmable wearable technology—vibrate q 15 min-1hr if sitting too long.
WALK
YOUR WAY TO BETTER HEALTH

Anatomy of Walking

- Boosts endorphins: Easing stress, tension, anger, fatigue, and confusion in ten minutes.
- Reduces glaucoma risk.
- Limits sickness by halving the odds of catching a cold.
- Halves Alzheimer’s disease risk over 5 years.
- Works arm & shoulder muscles.
- Improves heart health by increasing heart rate and circulation.
- Engages abdominal muscles.
- Improves blood pressure by five points.
- Limits colon cancer by 31% for women.
- Strengthens legs including quadriceps, hip flexors, and hamstrings.
- Improves balance.
- Builds bone mass reducing risk of osteoporosis.
- Only 30 minutes a day 5 times a week can make you healthier and happier.
HEALTH BENEFITS of WALKING

- WALKING 20 MINUTES/DAY WILL BURN 278 POUNDS OF BODY FAT/YEAR
- WALKING 45 MINUTES/DAY REDUCES ODDS OF CATCHING A COLD
- WALKING 1 MINUTE CAN EXTEND LIFE BY 1.5–2 MINUTES
- WALKING 20–25 MINUTES/WEEK CAN EXTEND LIFE BY SEVERAL YEARS

DEMENTIA
Seniors who walk 6–9 miles/week are less likely to suffer from mental decline as they age, including dementia.

DIABETES
Walking 30 minutes/day, 5 days/week, along with moderate diet changes, can halve the risk of Type 2 Diabetes.

HEART DISEASE
Walking 30 minutes/day, 5 days/week can halve the risk of heart disease and reduce stress, cholesterol, and blood pressure.

ARTHRTIS
Walking can reduce pain and improve function, mobility, mood, and quality of life, without worsening symptoms.

DEPRESSION
Walking triggers endorphins, promotes relaxation, and prevents anxiety and depression.

- WALKING 6 MILES/WEEK CAN_HALVE RISK OF ALZHEIMER'S DISEASE OVER 5 YEARS
- WOMEN WHO WALK FOR 1 HOUR/DAY, 3 DAYS/WEEK AND CONSUME 1,500 CALORIES/DAY CAN_LOSE AND KEEP OFF 25 LBS
- WALKING 30 MIN/DAY, 4 DAYS/WEEK CAN_REDUCE THE RISK OF DIABETES BY NEARLY 60%
- PROSTATE CANCER PATIENTS WHO WALK 90 MIN/WEEK HAVE NEARLY 50% LOWER MORTALITY RISK
- WOMEN WHO WALK REGULARLY ARE 3.19 TIMES LESS LIKELY TO DEVELOP COLON CANCER THAN THOSE WHO EXERCISE LESS THAN ONE HOUR/WEEK
Leisure Activities and the risk of dementia in the Elderly

- Leisure activities and the risk of dementia in the elderly.
- Verghese J¹, Lipton RB, Katz MJ, Hall CB, Derby CA, Kuslansky G, Ambrose AF, Sliwinski M, Buschke H.
AHA Recommendation

For Overall Cardiovascular Health:
• At least 30 minutes of moderate-intensity aerobic activity at least 5 days per week for a total of 150 minutes/week

OR
• At least 25 minutes of vigorous aerobic activity at least 3 days per week for a total of 75 minutes; or a combination of moderate- and vigorous-intensity aerobic activity

AND
• Moderate- to high-intensity muscle-strengthening activity at least 2 days per week for additional health benefits.

• For Lowering Blood Pressure and Cholesterol
An average 40 minutes of moderate- to vigorous-intensity aerobic activity 3 or 4 times per week

• www.heart.org
One metabolic equivalent (MET) is defined as the amount of oxygen consumed while sitting at rest and is equal to 3.5 ml O2 per kg body weight x min.
### World Health Organization: Moderate Intensity & Vigorous Intensity Exercise

<table>
<thead>
<tr>
<th>Moderate-intensity Physical Activity (Approximately 3-6 METs)</th>
<th>Vigorous-intensity Physical Activity (Approximately &gt;6 METs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requires a moderate amount of effort and noticeably accelerates the heart rate.</td>
<td>Requires a large amount of effort and causes rapid breathing and a substantial increase in heart rate.</td>
</tr>
<tr>
<td><strong>Examples of moderate-intensity exercise include:</strong></td>
<td><strong>Examples of vigorous-intensity exercise include:</strong></td>
</tr>
<tr>
<td>• Brisk walking</td>
<td>• Running</td>
</tr>
<tr>
<td>• Dancing</td>
<td>• Walking / climbing briskly up a hill</td>
</tr>
<tr>
<td>• Gardening</td>
<td>• Fast cycling</td>
</tr>
<tr>
<td>• Housework and domestic chores</td>
<td>• Aerobics</td>
</tr>
<tr>
<td>• Traditional hunting and gathering</td>
<td>• Fast swimming</td>
</tr>
<tr>
<td>• Active involvement in games and sports with children / walking domestic animals</td>
<td>• Competitive sports and games (e.g. Traditional Games, Football, Volleyball, Hockey, Basketball)</td>
</tr>
<tr>
<td>• General building tasks (e.g. roofing, thatching, painting)</td>
<td>• Heavy shovelling or digging ditches</td>
</tr>
<tr>
<td>• Carrying / moving moderate loads (&lt;20kg)</td>
<td>• Carrying / moving heavy loads (&gt;20kg)</td>
</tr>
</tbody>
</table>
Heart rate during moderately intense activities is about 50-69% of your maximum heart rate.

Heart Rate during hard physical activity is about 70% to less than 90% of the maximum heart rate.
Moderate Intensity Exercise

Source: Cleveland Clinic

- **Walking** two miles in 30 minutes
- Biking five miles in 30 minutes
- **Swimming** laps for 20 minutes
- Running one and a half miles in 15 minutes
- Doing water aerobics for 30 minutes
- Playing volleyball for 45 minutes
- Playing pick-up basketball for 20 minutes
- Jumping rope for 15 minutes
- Walking stairs for 15 minutes
- Washing your car for 45 minutes to an hour
- Gardening for 30 to 45 minutes
- Raking leaves for 30 minutes
- **Dancing** for 30 minutes
Target Heart Rate

- Start low - 50% of your Target Zone
- Gradually increase up to 85% of Target Zone, as tolerated.
- People with heart conditions and on beta blockers, need to discuss with their physicians.
Karvonen Formula—Target Heart Rate

- Subtract your age from 220 to get your maximum heart rate.
- Next, subtract your resting heart rate from your maximum heart rate.
- Multiply that number by your percentage of training intensity. Then add your resting heart rate to get your target heart rate.

Ex: 50 year old woman, with resting heart rate of 70 (first thing in morning while in bed)
- 220-50=170 (maximum heart rate)
- 170-70=100
- \( (100 \times 50 \text{ percent}) + 70 = 120 \) (target heart rate)
## Target Heart Rates---Source: American Heart Association

<table>
<thead>
<tr>
<th>Age</th>
<th>Target HR Zone 50-85%</th>
<th>Average Maximum Heart Rate, 100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 years</td>
<td>100-170 beats per minute</td>
<td>200 beats per minute</td>
</tr>
<tr>
<td>30 years</td>
<td>95-162 beats per minute</td>
<td>190 beats per minute</td>
</tr>
<tr>
<td>35 years</td>
<td>93-157 beats per minute</td>
<td>185 beats per minute</td>
</tr>
<tr>
<td>40 years</td>
<td>90-153 beats per minute</td>
<td>180 beats per minute</td>
</tr>
<tr>
<td>45 years</td>
<td>88-149 beats per minute</td>
<td>175 beats per minute</td>
</tr>
<tr>
<td>50 years</td>
<td>85-145 beats per minute</td>
<td>170 beats per minute</td>
</tr>
<tr>
<td>55 years</td>
<td>83-140 beats per minute</td>
<td>165 beats per minute</td>
</tr>
<tr>
<td>60 years</td>
<td>80-136 beats per minute</td>
<td>160 beats per minute</td>
</tr>
<tr>
<td>65 years</td>
<td>78-132 beats per minute</td>
<td>155 beats per minute</td>
</tr>
<tr>
<td>70 years</td>
<td>75-128 beats per minute</td>
<td>150 beats per minute</td>
</tr>
</tbody>
</table>
Talk Test: Estimating Exercise Intensity

- For Moderate Intensity:
  You should be able to talk to others without gasping for air. Speaking will take a little more effort than usual, but you should be able to carry on a conversation.

- For Vigorous Intensity:
  Holding a conversation or saying more than a few words before stopping to take a breath
The American Heart Association Recommendations for Physical Activity in Adults

For Overall Cardiovascular Health:

At least 30 minutes of moderate-intensity aerobic activity per week for a total of 150 minutes

OR

At least 25 minutes of vigorous aerobic activity per week for a total of 75 minutes

or a combination of the two

AND

High Intensity

For Lowering Blood Pressure and Cholesterol:

An average of 40 minutes of moderate- to vigorous-intensity aerobic activity per week

© 2015 Learn more at heart.org/ActivityRecommendations.
Walking as Precursor to Dancing
Dancing is Exercise!!
Dancing is fun!!!
Chiro-Dancing!!
Dancing becoming a trend

- Dancing with the Stars
- So you think you can dance
- Flash Mob
- Zumba Craze
- National Dance Day—2010

http://dizzyfeetfoundation.org/national-dance-day/: “This grassroots campaign encourages Americans to embrace dance as a fun and positive way to maintain good health and combat obesity.”
10 Reasons to Dance
ww.dance-teachers.org (UK)

- Dance keeps both the body and the brain active, vital for people of every age
- Dance offers a way to improve strength and flexibility, which helps keeps muscles and joints healthy
- Choosing to start a new hobby can help you meet new people and make friends with people who have similar interests
- Dance helps you learn about your body, improving your posture and balance
- Taking time out in the day to partake in a hobby can help to reduce stress levels
- Dance can offer insight into other cultures, either through the dance style itself or meeting new people
- Dance can led to new career opportunities, or help build vital communications skills needed in every profession
- Participating in dance can help increase your self esteem and confidence through mastering new skills
- Dance offers a creative outlet for people to express their personalities in a safe environment
- Dance is a fun way open up
Hooked on a Feeling!
Origins of Dance

“Why do humans appreciate rhythmic movements?”

Wang “suggest(s) that human appreciation of rhythmic movements and rhythmic events developed from the natural selection of organisms adapting to the internal and external rhythmic environments”

Group Bonding

- arose from community dancing (to music) in earlier eras,
- Military--coordinated drills camaraderie, esprit de corps. (Trehub)
Dance- Cultures and Self-Expression

- human culture, rituals and celebrations. Today, most dancing is about recreation and self-expression, although it can also be done as a competitive activity. Dancing is an enjoyable way to be more physically active and stay fit.

The Jewish Hora
Greek Dancing
“Dancing stimulates the mind, body, & soul. It has been proven to increase cognitive strengths and prolong life; that is the Miracle of Dance.”

~Lai Rupe’s Choreography

www.LaiRupe.com
Why Dance?

- It’s fun
- It’s social
- It’s aerobic
- Increased endorphins
- Freedom
- Self-Expression
- Healthy
- Can do it anywhere!!
- It’s free!!
- Weight Loss
- Fitness
Health Benefits of Dancing (some anecdotal)

- Cardiovascular fitness
- Strength
- Mood
- Self esteem
- Libido
- Stress reduction
- Flexibility
- Constipation
- Immune System
- Social benefits—connection, bliss
- Brain health—memorizing moves and healthy aging
- Osteoporosis prevention
MORE MUSIC

+ 

DANCE & MOVEMENT

Improved concentration & focus

Improved memory-listening to familiar music

Improved recovery from exercise & reduction in pain

Improved mood -> happier

Workout performance improved

Reduced stress & anxiety

Better SLEEP

Increased potential for weight loss
Healthcare professionals' perceptions of the value and impact of the arts in healthcare settings: A critical review of the literature.
RESULTS:

- Majority of staff: engaging in arts interventions has a positive impact on patients' health and well-being. Impact on patients' stress, mood, pain levels, and sleep.
- Enhance communication between staff and patients, build rapport and strengthen interactions.
- Arts activities—music, dance, in healthcare settings found to: decrease stress, improve mood, improve job performance, reduce burnout, improve patient/staff relationships, improve the working environment and improve well-being.


Healthcare professionals' perceptions of the value and impact of the arts in healthcare settings: A critical review of the literature.

Wilson C1, Bungay H2, Munn-Giddings C3, Boyce M4.
Exercise and Bone Health
Exercise and Bone Health

- progressive resistance training + walking or aerobic dancing

- Improve bone density in the spine and hip in postmenopausal women


Mechanical stimuli and bone health: what is the evidence?

Cheung AM¹, Giangregorio L.
The myokine irisin increases cortical bone mass

Graziana Colaianni, Concetta Cuscito, Teresa Mongelli, Paolo Pignataro, Cinzia Buccoliero, Peng Liu, Ping Lu, Loris Sartini, Mariasevera Di Comite, Giorgio Mori, Adriana Di Benedetto, Giacomina Brunetti, Tony Yuan, Li Sun, Janne E. Roseland, Silvia Colucci, Maria I. New, Mone Zaki, Savario Cinti, and Maria Grano

Author Affiliations

Contributed by Maria I. New, August 21, 2015 (sent for review May 21, 2015; reviewed by Christopher Huang and Carlos M. Isles)

A correction has been published

Abstract | Full Text | Authors & Info | Figures | SI | Metrics | Related Content | PDF | PDF + SI

Significance
Physical Exercise and Bone Synthesis

- It is unclear how physical activity stimulates new bone synthesis
- Myokine, irisin
- Stimulates cortical bone growth in rats
- Muscle-bone connectivity
- Osteoporosis, sarcopenia

PNAS> vol. 112 no. 39 > Graziana Colaianni, 12157-12162, doi: 10.1073/pnas.1516622112
Mechanical stimuli and bone health: what is the evidence?

Observational trials: suggest that physical activity participation results in higher bone mass but Clinical trials suggest that the effects of exercise on areal bone mineral density are small, and vary with the site measured and the type of exercise.

KEY POINTS

- Older adults should engage in challenging balance exercises to prevent falls and combine strength training with weight-bearing aerobic exercise to prevent bone loss. The effects are not limited to postmenopausal women.

- Exercise programs that emphasize walking over balance training or strength training may not be the best approach for preventing falls or fractures.

- Exercise may also have an effect on pQCT-based assessments of volumetric BMD, but the studies in this area are limited in number and sample size.

- Exercise-mediated alterations in the Wnt/β-catenin signaling pathway may facilitate the maintenance of bone mass.

- Low magnitude whole body vibration therapy alone does not affect bone density or structure in healthy postmenopausal women with low bone mass.
“Non-weight-bearing bones like the skull do not require mechanical loading to maintain their bone structure, whereas the tibia will lose a substantial amount of bone mass if subjected to disuse for several weeks.”

Few epidemiological studies have investigated the long-term associations between physical activity during adulthood and areal bone mineral density (aBMD) later in life. (Mechanical stimuli and bone health: what is the evidence? Cheung, Angela M.; Giangregorio, Lora)
Physical activity and exercise are important for the maintenance of musculoskeletal health as we age.

In older adults, physical activity and exercise only have minimal effects on BMD; perhaps fall prevention and strength training should be the focus for this population.

Low-magnitude WBV does not appear to improve BMD and bone structure in postmenopausal women. Future studies need to investigate the effect of exercise in older populations with compromised bone health such as those with rheumatological diseases and those with a history of fragility fractures. (Mechanical stimuli and bone health: what is the evidence? Cheung, Angela M.; Giangregorio, Lora)
Exercise and Bone Density

Based on current data, the best type of exercise for postmenopausal women to improve both spine and hip BMD is progressive resistance training, either alone or in combination with other interventions.

Mechanical stimuli and bone health: what is the evidence? Cheung, Angela M.; Giangregorio, Lora
Ballroom Dancing is Fun!
Dancing for People with Disabilities
She Without Arm, He Without Leg
Wheelchair Dance Performance for World Stroke Day

The Wheelchair Abilities Dance Program, a recreational therapy program organized by the Klingenstein Clinical Center (KCC) of The Mount Sinai Hospital, recently featured a dance performance at the World Stroke Day Fair held on Thursday, October 29, in the Guggenheim Atrium. The unique program allows outpatient stroke survivors and people with multiple sclerosis or spinal cord injuries to gain independence through dance classes.

The KCC houses an inpatient and outpatient recreational therapy department that utilizes music, dance, and art to aid in the patient recovery process and improve well-being.

“These programs offer our patients an alternative method for their healing process,” says Clarisse Quirit, CTRS, Recreational Therapist, Mount Sinai Rehabilitation Center. “It is inspiring to see the smiles on their faces.”

Choreographer Diane Discepolo leads Kimberly Trenard, left, and Sabrina Bennett in a wheelchair dance.
Wheelchair Dancing!
Chair Exercises and Chair Dancing

Chair Exercises

- **Cardiovascular exercises**
  - raise your heart rate and increase your endurance.

- **Strength training**
  - using weights or other resistance
  - to build muscle and bone mass, improve balance, and prevent falls.

- **Flexibility**
  - range of motion,
  - prevent injury
  - reduce pain and stiffness.
  - prevent or delay further muscle atrophy.

Chair Exercise for Seniors
Chair Dancing!!
Ditch the routine,
Join the party!
Zumba—for Beginners
Zumba®: It’s Fun but is it Effective?
“Ditch the workout. Join the Party”

Zumba is a Latin-inspired dance workout first developed in Columbia in the mid-’90s by celebrity fitness trainer Alberto “Beto” Perez.

15 million people, 180 countries (https://www.zumba.com/en-US)

“The goals of Zumba are for participants to improve strength, balance, coordination, and cardiovascular endurance.”

“anecdotally, doctors are seeing more Zumba-related injuries.”

Prospective studies are also needed to compare rates of injury in Zumba to other forms of dance fitness classes such as aerobics and jazzercise.

The health-enhancing efficacy of Zumba® fitness:

- An 8-week randomised controlled study.
- Community-recruited cohort of overweight and physically inactive women.
- Physiological effects on cardiovascular risk factors and inflammatory biomarkers.
- Mental health-enhancing effects on factors of health-related quality of life (HRQoL).
- N=10 women—1 or 2, 1 hour Zumba Classes per week.
- Control N= 10 women—maintenance of habitual physical activity.

The health-enhancing efficacy of Zumba® fitness:

Physiologic Markers:
- Maximal oxygen uptake significantly increased
- Per cent body fat significantly decreased
- Interleukin-6 and white blood cell (WBC) count both significantly decreased

Quality of Life Markers:
Enhancement:
- physical functioning
- general health, energy/fatigue and emotional well-being

[284x32]Epub ahead of print] Domene PA1, Moir HJ1, Pummell E1, Knox A2, Easton C2.
Zumba Gold®: Are The Physiological Responses Sufficient to Improve Fitness in Middle-Age to Older Adults?

“Zumba Gold® is a modified form of Zumba that was designed to meet the anatomical, physiological, and psychological needs of seniors.”

Lack of Research

Study Purpose:

(a) to assess the cardiovascular and metabolic responses to Zumba Gold® and

(b) to determine if Zumba Gold® meets current guidelines for improving and maintaining cardiorespiratory fitness.

Zumba Gold® vs. Wii Fit and Walking
Exercise Intensity

- N= 16, 9 men, 7 women, Average age 63.4, average weight 147#
- “Participation in a single exercise class of Zumba Gold® in middle age and older adults elicits cardiovascular and metabolic responses that fulfill exercise intensity guidelines for improving and maintaining cardiorespiratory fitness.”
- Moderate-intensity physical activity in metabolic terms has been classified as 3 to 6 METS.
- Zumba Gold—participants averaged 4.4 METS
- Treadmill and over ground walking at 3.0 miles per hour is an equivalent moderate-intensity physical activity at 3.3 METS.
- Likewise, Guderian and colleagues (2010) recently reported that playing Wii Fit video games is a feasible alternative to more traditional aerobic exercise modalities for middle-aged and older adults that elicit a 3.5 mean MET value response.
Zumba Gold® and Exercise Intensity

“Exercise intensity is arguably the most critical component of the exercise prescription model.

Failure to meet minimal threshold values may result in lack of a training effect, while too high of an intensity could lead to over-training and negatively impact adherence to an exercise program (Franklin, 2007).

Current Study: Moderate intensity

Zumba Gold® and Exercise Intensity

Older Populations:

- Low cardiorespiratory fitness
- premature mortality.
- and contribute to a reduction in physiological functional capacity; result in loss of independence

Zumba® Related Injuries

- One Study N=49, Ave. age 43.9 (Inyoue, 2013)
- Injuries, N= 14
- Average number or classes attended per week =3, 1-2 hour classes

<table>
<thead>
<tr>
<th>Number of participants</th>
<th>Percentage of participants</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Participants reporting injuries (n= 14)</strong></td>
<td></td>
</tr>
<tr>
<td>Sought medical treatment</td>
<td>7</td>
</tr>
<tr>
<td>Self-treatment only</td>
<td>2</td>
</tr>
<tr>
<td>No treatment needed</td>
<td>5</td>
</tr>
</tbody>
</table>
Injuries from Zumba®

- No sig. differences in age (44.9 versus 43.5 years, respectively; $P = .74$)
- How long they had taken Zumba (13.1 versus 11.2 months, respectively; $P = .35$)
- Length of classes (1.21 versus 1.17 hours, respectively; $P = .75$)

Injuries from Zumba®

- Increased with the increased number of classes/week
- >= 4 classes per week, increased injuries
- Multiple injuries some people
- Knee (42%) most common
- Ankle/foot (14%), shoulder (14%), elbow (5%), calf (5%), lower back (5%), neck (5%), thigh (5%), and muscle pain (5%).

Injuries from Zumba®

- “Prospective studies are also needed to compare rates of injury in Zumba® to other forms of dance fitness classes such as aerobics and jazzercise.”

- Timing of injuries—this study didn’t differentiate between new Zumba® participants or after doing Zumba® for awhile.

- “This has also been observed in research on classical ballet and jazz/contemporary dancers, where greater weekly frequency of practice was associated with occurrence of injuries.”

Zumba® vs. Dance and Fitness--Injuries

- “Dance and fitness programs such as aerobics and jazzercise have been around for longer and also involve many lateral (side-to-side) movements set to music.”

- Zumba® injuries similar to dance and aerobics (Achilles tendon pain, calf pain, shin splints, plantar fasciitis, etc). Thus, applying recommended injury-reduction techniques from dance, aerobics, and jazzercise to Zumba® may be reasonable.”

Prevention Tips for Zumba®, Dance Fitness, Aerobics

- Warm-up/Cool Down
- Proper shoes
- Hydration
- Cross Training
- Smaller Zumba Classes
- Improved Training for Instructors
- Appropriate Class Level (Zumba Gold®)
- “RICE”

Zumba®—Recommendations for Patients

- Start with ≤ 3 Classes/wk
- Rest one or two days in between classes, and
- Decrease the frequency of workouts if they start to feel pain, discomfort, or fatigue.

My Personal Experience with Zumba

- Noise Levels’ too high—dangerous
- Felt good a few hours afterwards
- Instructors variable
- To become a Zumba instructor: one day training—10 hours
Dance, Music, and Mood
Music and Dance and Social Bonding

- Music-making, and movement to music, are activities central to ritual, courtship, identity, and human expression cross-culturally.
- Music has played an important role during our evolutionary history.
- Endorphins (and the endogenous opioid system (EOS)—social bonding, laughter, synchronized sports, and singing and dancing.

Why do people listen to music?

- regulate arousal and mood
- to achieve self-awareness
- expression of social relatedness

Music as Mystery

- Music is a mystery. According to Darwin [22], it “must be ranked amongst the most mysterious (abilities) with which (man) is endowed.” Perlovsky

- Music seems to be an enigma (Perlovsky) -- According to Darwin [22], it “must be ranked amongst the most mysterious (abilities) with which (man) is endowed.” Perlovsky

- Most existing theories contradict each other, and cannot explain mechanisms or roles of musical emotions in workings of the mind, nor evolutionary reasons for music origins. (Perlovsky)
Origins of Music—cont’d--Summary

- Musical power over human soul and body has remained mysterious from Aristotle to the 20th century cognitive science.
- Contemporary evolutionary psychologists have recognized music as a cultural universal of tremendous power.
- Still its fundamental role and function in cognition, its role in evolution of consciousness and culture have remained hidden.
“Endorphins (and the endogenous opioid system (EOS) in general) are involved in social bonding across primate species, and are associated with a number of human social behaviors (e.g., laughter, synchronized sports), as well as musical activities (e.g., singing and dancing). “

Exercise and Mood

Exercise duration and mood state: how much is enough to feel better?

Improvements in mood after 10 min, 20 min, and 30 min

Exercise duration and mood state: how much is enough to feel better?
Hansen CJ1, Stevens LC, Coast JR.
Older Adults, Mood, and Exercise

- N= 16 trained women, (Mage = 64.5 +/- 7.6 yr.)
- One 75 min session of aerobic line dancing
- Significant decreases following exercise in scores on Tension, Depression, Fatigue, and Anger and a significant increase in scores on Vigor relative to preexercise (control) scores were found. Global mood was significantly improved after the exercise session

Tango Dance vs. Mindfulness Meditation for Depression

- N= 66
- Tango Dancing as effective as mindfulness meditation in reducing levels of self-reported depression. (1.5 hours/week or either tango or mindfulness meditation) over 6 weeks.
- Tango Group also increased levels of mindfulness.
- Stress levels sig. reduced only in the Tango Group.

Argentine tango dance compared to mindfulness meditation and a waiting-list control: A randomised trial for treating depression. Pinniger, Rosa et al. Complementary Therapies in Medicine, Volume 20, Issue 6, 377 - 384
**Health Benefits of Dance in Older People**

**CONCLUSIONS:**

The findings suggest that dance, regardless of its style, can significantly improve muscular strength and endurance, balance, and other aspects of functional fitness in older adults. Future researchers may want to analyze the effects of dance on mental health and explore ways to make this intervention attractive to both genders. Standardizing outcome measures for dance would facilitate meta-analysis.


The Effectiveness of Dance Interventions to Improve Older Adults' Health: A Systematic Literature Review.

Hwang PW, Braun KL.
“Exergame” vs. Brisk Walking in Elderly Females

- 26 Sedentary Elderly females
- Dance Dance Revolution (DDR) vs. Brisk Walking vs. Sedentary
- DDR or Brisk Walking 3x/week, Sedentary
- Flanker Task—selective attention—reaction time
- Findings:
  - Improved CV fitness in the DDR and Walking groups
  - Improved cognitive reaction time

A 3-month intervention of Dance Dance Revolution improves interference control in elderly females: a preliminary investigation.
Chuang LY1, Hung HY, Huang CJ, Chang YK, Hung TM.
Dance Dance Revolution vs. Brisk Walking

- Having fun has been shown to be the main reason that older adults adhere to their physical activity programs (Resnick and Spellbring 2000).
Dance Dance Revolution vs. Brisk Walking

- Individuals perceive that they are “dancing” or “playing” rather “exercising,” which may influence the intensity and energy expended during game play (Scheone et al. 2013; Sell et al. 2008).
Dance Dance Revolution vs. Brisk Walking

- DDR can be used as a viable approach for the elderly to harvest both physical and mental health.
Dance and Children
Dance and Children

- “The majority of youth are not meeting the US Department of Health and Human Services physical activity guidelines.
- Dance is a popular activity, particularly for girls, and has the potential to increase physical activity for many youth.
- This study investigated physical activity of children and adolescents in 7 dance types: ballet, hip-hop, jazz, Latin-flamenco, Latin-salsa/ballet folklorico, partnered, and tap. “
- N=264 girls: 154 children and 100 adolescents; used an Accelerometer
- Results: Physical activity levels are low in youth dance classes, especially compared to youth sport activities like baseball and soccer.

The interactive dance game is Dance Dance Revolution (DDR) (Konami, Redwood City, CA) a Sony Playstation® 2 game with a dance mat that attaches to the Playstation 2 console.

This study provides support for the use of interactive dance games in intervention programs to prevent or treat pediatric obesity

Results:

Results showed the interactive dance game was more reinforcing than dancing alone or dancing while watching the video (p = .003), but there was no difference across bicycling conditions. Nonoverweight youth were more active when given the opportunity to play the interactive dance game than overweight children (p = .05).

Concl: Children may be motivated to be active when given the opportunity to play an interactive dance game.

DDR and 2 year old
Dance Dance Revolution
Dance and Less TV for Kids

- N= 61, 8-10-year-old African-American girls and their parents/guardians.
- **Treatment Group:** After-school dance classes at 3 community centers, and a 5-lesson intervention, delivered in participants' homes, and designed to reduce television, videotape, and video game use.
- **Control Group:** Receiving newsletters and receiving health education lectures.
- **Results:** Intervention Group vs. Controls
  - Decreased BMI
  - Increased after school physical activity
  - Decreased household viewing of TV
  - Decreased concern about weight
  - Increased school grades

Dance and Adolescent Girls

- Aim: to describe the physical activity levels of girls during dance classes and to identify factors associated with moderate-to-vigorous physical activity (MVPA) in those classes.
- N=137 girls (11 to 18 years-old) enrolled in ballet, jazz, or tap dance classes from 11 dance studios.
- Findings: Jazz/tap classes provided more MVPA than ballet classes
- CONCLUSION:

Dance classes provide valuable opportunities for adolescent girls to be physically active.

Dance and Children

- Suggested strategies for improving physical activity:
  1. Pediatricians could recommend more active dance types—jazz, hip hop, and partnered dances.
  2. Increase physical activity across all dance types.
  3. Reduce barriers to more physically active dance classes—public dance classes less expensive in this study.

Dance reduces heart disease and DM risk factors in Children

- 43% NYC school age children are overweight or obese
- Increased risk for heart disease and Type 2 DM.
- Prospective cohort study January 2008 and September 2010 at a public elementary school in NYC, designed to evaluate the effectiveness of an after-school program combining dance, nutrition, and lifestyle modification on reducing risk factors for CVD and T2DM

Afterschool Freestyle Dance Program Study

- N= 64 NYC Elementary School Children -4th and 5th graders
- Duration: 16 weeks
- Study intervention: 4 hours of 60 min sessions of high intensity freestyle dance—including high-intensity dance genres included mambo, cha-cha, hip hop, and swing.
- plus
- Diet and Lifestyle Counseling
- Results:
  - BMI dropped in overweight and obese categories;
  - Significant improvements in BMI percentiles
  - Endurance improved, dec. risk tests for DM, CHD. Improvement was also reported in lifestyle choices.

Salsa at Home
Latin Dance Mix
Dance Movement Therapy (DMT)

- Is practiced in mental health, rehabilitation, medical, educational and forensic settings, and in nursing homes, day care centers, disease prevention, health promotion programs and in private practice.
- Is effective for individuals with developmental, medical, social, physical and psychological impairments.
- Is used with people of all ages, races and ethnic backgrounds in individual, couples, family and group therapy formats.

Source: American Dance Therapy Assn.
Dance Movement Therapy
A Systematic Review of the Evidence for the Effectiveness of Dance Therapy. The quality of the RCTs ranged from poor to good.

In most cases, the reviews and trials reported positive benefits related to improvements in quality of life, self-esteem, or coping with a disease.

Conclusion: Most studies have found therapeutic benefits of dance therapy, although these results are based on generally poor-quality evidence. Dance therapy should be considered as a potentially relevant add-on therapy for a variety of conditions that do not respond well to conventional medical treatments. Well-performed RCTs and observational studies are highly recommended to determine the real value of dance therapy.
Dance Movement Therapy and Depression

Compared to the “Treatment as Usual”, adding DMT seemed to improve the effect of the treatment. The effect of the DMT was observable whether the patient was taking antidepressant medication or not.

A dance movement therapy group for depressed adult patients in a psychiatric outpatient clinic: effects of the treatment.

Päivi M. Pylvänäinen,1,2,* Joona S. Muotka,2 and Raimo Lappalainen2
This study investigated the effect of adding dance/movement group therapy (DMT) to the treatment of psychiatric outpatients with a diagnosis of depression. Compared to the TAU (Treatment as usual), adding DMT seemed to improve the effect of the treatment. There was a tendency for the effect of DMT to be slightly better with patients who were not taking anti-depressive medication.

Dance Therapy and Depression

“The low-quality evidence from three small trials with 147 participants does not allow any firm conclusions to be drawn regarding the effectiveness of DMT for depression. Larger trials of high methodological quality are needed to assess DMT for depression, with economic analyses and acceptability measures and for all age groups.”

Music, Dance, and Pain threshold

- Active listening—drumming, singing, dancing that raised the pain threshold vs. passive listening to music.

How does music make you feel?
Dancing and Constipation


Definitions: Physical Fitness

5 components:
- Cardiopulmonary endurance
- Muscular endurance
- Muscular strength
- Body composition
- Flexibility

“These responses are of interest as positive affective and exertional responses experienced during physical activity may play an important role in predicting adherence.”

Exercise: Prevention for Neurological Disorders

- Reduction in risk for various neurological disorders, notably for cognitive decline, dementia and Alzheimer’s (Larson et al., 2006; Hamer and Chida, 2009; Sofi et al., 2011; Buchman et al., 2012).

- There is also support linking engagement in physical exercise to a reduced risk for onset of Parkinson’s (Xu et al., 2010) as well as stroke incidence (Do Lee et al., 2003), although these findings are not as robust as those for dementia and cognitive decline. Such epidemiological related studies suggest exercise having a neuroprotective effect in relation to the onset of various neurological disorders (Hillman et al., 2008).

Neurorehabilitative benefits of dance

- Dance may aid physical and cognitive impairments, particularly due to its combined nature of including both physical and cognitive stimulation.
- Incorporate physical and motor skill-related activities, but it can
- Also engage various cognitive functions such as perception, emotion, and memory, all while done in an enriched environment.
- Promoting adherence
- Enjoyable
- The potential of dance as an alternative therapy in neurorehabilitation.

Dance and Multiple Sclerosis

- **Dance therapy** as a rehabilitative method has shown promise in **neurological disorders** such as **traumatic brain injury, spinal cord injury, stroke, autism, sensory loss and Parkinson’s disease**.

- Almost no data on Dance and MS

- **Pilot Study**

- N=8 MS patients

- **Intervention:** 2 hours structured progressive Salsa dance classes plus 30 min home practice/week

- **Conclusion:** This study suggests that dance for persons with MS may have promise for **improving physical activity, gait and balance**.

Salsa
Psychophysiological Responses to Salsa Dance

Study:

- 10 pairs of non-professional Salsa dancers
- 3 different styles of Salsa—2 structured dances and 1 non-structured, 3 different environments: lesson, nightclub
- Measured % of Heart Rate Reserve (%HRR) and Affective Response
- Perceived Exertion was defined as the subjective intensity of effort, strain, discomfort, and/or fatigue that was felt during exercise
- The Feeling Scale (FS) [28] was used to measure “basic” or “core” affective valence (pleasure-displeasure)

“These data support that different Salsa dance styles provide physiological stimuli adequate to promote health and fitness benefits, and perhaps more importantly, produce pleasurable experiences, which in turn might lead to an increase in adherence to Salsa dancing which likely provides exercise-like health benefits.”

Dance and Parkinson’s Disease
Dance and Parkinson’s Disease

- Dance for Parkinson’s Disease--http://danceforparkinsons.org/
- Mark Morris Dance
- Programs in 30 states, 8 countries
Dance for Parkinson’s Disease
Dance and Parkinson’s Disease

- Neurodegenerative disorder: motor and non-motor symptoms with a chronic progressive course.
- No Cure
- Treatment: symptomatic treatment
  - Drugs: dopaminergic (Levodopa—gold standard)
  - Surgery: Deep Brain Stimulation (DBS)

Dance and Parkinson’s Disease

- Even with treatment, Patients with PD still experience a progressive deterioration of their autonomy.
- Increasing disability—”largely related to non-dopaminergic features such as gait, balance, and posture.”

Interventions for Parkinson’s—the evidence

- **Physical exercise** was originally proposed as a treatment PD many years ago—but early studies—poor qualities.

- New evidence: Exercise:
  - Positive effects on quality of life of older people and people with neurodegenerative disorders.
  - Improves both motor and non-motor features of PD
  - REDUCED RISK OF DEVELOPING PARKINSON’S DISEASE.

“exercise-induced brain plasticity” (namely, the ability of central nervous system cells to modify their structure and function in response to a variety of external stimuli, i.e. experience) is likely to represent the neural basis of rehabilitation for PD [12].”

“In addition, increasing evidence suggests that physical exercise reduces chronic oxidative stress (increased mitochondria biogenesis and autophagy up-regulation) and stimulates the synthesis of neurotransmitters and trophic factors [13]. Both these neurochemical phenomena contribute to neuroplasticity.”

Exercise and Parkinson’s Disease—Cont’d

- Physical exercise and exercise-related plastic changes are the basic elements of motor learning.
- Question: Can patients with PD retain sufficient capacity to re-acquire or to learn new skills.
  - Literature: inconclusive, and confounded – Dopaminergic medication may enhance motor-related processes involved in sequence learning but may interfere with cognition related processes.
  - Learning rates and performance are reduced in comparison to nl controls.
  - Physical therapy and Neuromodulation together—may help.

Suggested Principles for Phys. Exercise in PD

• Goal-based learning:
  - Practice of activities that lead to improved performance (e.g. gait/posture)
• Experience-dependent neuroplasticity, including:
  - Intensity, repetition, specificity, difficulty, and complexity of practice
• Aerobic training:
  - Vigorous and sustained activity to increase cardio-pulmonary function, oxygen consumption and blood flow to the brain
• Enhanced cognitive engagement through:
  - Feedback (verbal or proprioceptive)
  - Attentional demand (cueing or dual tasking)
  - Motivation (reward)
• Feasibility:
  - Optimal medication status
  - Realistic objective
  - Barriers avoidance

Non-conventional strategies for PD

- Music Therapy
- Dance Therapy
- Martial Arts (T’ai Chi)—improves postural control with decrease in falls.
- Pleasurable, social engagement

European Physiotherapy Guidelines for PD

5 Core Areas
- Physical Capacity
- Transfers
- Manual Activities
- Balance
- Gait
Dance Therapy and Parkinson’s Disease

- Dance therapy—separate from PTx.
- Alternative to regular exercise or physical activity
- Additional components of rhythmic timing, musical cueing, and socialization in most instances.
- Enjoyable and culturally integrated in communities→increased long term adherence.

Dance Therapy and Parkinson’s Disease

- Furthermore, the associated emotions may improve movements in their own right, and dancing with a partner provides a safety element in preventing falls by holding on to the partner. The randomized controlled trials performed in the last few years support the potential effectiveness of different dance interventions, such as tango or virtual reality dancing on a videogame system (Nintendo Wii), on symptoms in different domains, including motor function, spatial cognition, disease severity, activities of daily living, social participation, and depression.38-41 (Nonpharmacological Treatments for Patients with Parkinson’s Disease) Bastiaan R. Bloem, MD, PhD, 1†)
Dance Therapy and Parkinson’s Disease

- Future studies, however, need more rigorous designs,
- with larger samples, and appropriate outcomes.
- (Nonpharmacological Treatments for Patients with Parkinson’s Disease, Bastiaan R. Bloem, MD, PhD,†)

T’ai Chi and Parkinson’s Disease

- T’ai chi here, which is not a classic dance intervention, but a very specific type of exercise that contains many balance elements. A recent study on T’ai chi in 195 PD patients showed a positive effect on balance, step length, and functional reach compared with other interventions (resistance training, stretching). In a recent secondary analysis of patient-reported outcomes, T’ai chi participants reported better scores on the Parkinson’s Disease Questionnaire than participants in other interventions (Table 1).
Dance and Breast Cancer

- Greeting and general warm up
- Mild rhythmic body movement, group dance, movement
- Improvisation with positive themes (e.g., care, love, positive mood, warm, strength, hope)
- Group movement interaction (extension and expansion of movement evolved from improvisation)
- Sharing of movement experience and discussion, encouraging mutual support and self-understanding
- Relaxation exercises, mild stretching, and cool-down. To help with stress reduction and anger management, preparation for transition to daily life

Dance Therapy and Breast Cancer

- Chinese Study—Hong Kong—2 groups of women undergoing radiotherapy.
  - One group—received DMT x 3 weeks during radiotherapy.
  - Second Group—received DMT x 3 weeks (same intervention) 1-2 months post radiotherapy.

Results: Dance movement therapy helped them
  1. cope with cancer, treatment, and physical symptoms;
  2. improve mental well-being, attention, and appreciation for the self and body;
  3. improve total functioning;
  4. bridge back to a normal and better life; and
  5. participate in shared positive experiences. The radiotherapy group reported categories 1 and 2 more prominently than did the postradiotherapy group.

Dance and Stroke Rehab

- 5 Components to the modified dance routine:
  - warm up, technical exercises, improvisation, a short routine and a cool down.
- Combination of Jazz and Merengue
- popular hits of the 50s’ to 80s’
- Pilot study N=16
- Post-Stroke—1 to 6 months

Dance and Stroke Rehab

JAZZ DANCE
“combines whole-body movements requiring flexibility, balance and endurance, with perceptive-cognitive skills”

Swing and rock-and-roll

Relating to a previous dance experience.

“Choreography or short routine”
- repetition of the dance steps
- memorization
- additional challenge of remembering a sequence of steps.

Dance and Stroke Rehab

Merengue

- basic steps of the merengue incorporated into the dance intervention, the steps are simple
- easy to learn and
- promote the transfer of weight from one side to the other.

Merengue--Basic
Dance exercises targeted:

- flexibility
- balance
- endurance
- upper extremity function
- perception (visual imagery and incorporation of the affected side for individuals with hemineglect)

- Memory

N=16 small study
Potential obstacles to recruiting participants for Dance Therapy—not all Clinicians and Program Coordinators will be open to this.
Monitoring for fatigue of the patients
Low risk
Enjoyable
Little equipment and space is needed.
Innovative adjunct therapy to target multiple impairments in individuals in the subacute stage of post-stroke recovery, in a hospital setting.
Dance and Stroke—Positive effects on Patients

- Confidence to move in their own body and dance in an informal social context.
- One participant said “(The dance intervention) allowed me to meet other people with the same kind of problems as me”.
- Another one expressed that “The exercises are not easy, but I have a lot of fun to attend those classes”.
- Participants also spontaneously reported an improvement in their standing balance and a decreased fear of falling: “I feel safer to move when I'm standing”, “I can see that my balance is better, because of the dance group”.
Exercise and the Brain:
Healthy Aging
Fig. 1. Overview of individual components of multi-domain interventions for healthy brain aging: a selection of possible elements for cognitive training and physical activity embedded in a social environment, depending on specific biological factors.

Soledad Ballesteros, Eduard Kraft, Silvina Santana, Chariklia Tziraki

Maintaining older brain functionality: A targeted review

Neuroscience & Biobehavioral Reviews, Volume 55, 2015, 453–477

http://dx.doi.org/10.1016/j.neubiorev.2015.06.008
Healthy Aging

- Intellectual and social activities during adulthood suffer less age-related cognitive decline as they age (e.g., Amieva et al., 2010, Stern, 2009 and Wilson et al., 2013).

- Individuals with a high level of education and physical fitness as well as those engaged in leisure activities and bilinguals appear to have healthier brain aging.

- Negative effects on brain and cognition: APOE-4 gene, vascular risk factors such as smoking, diabetes and obesity.

Dance and The Brain: “Maintaining Older Brain Functionality”

- Although normal aging is associated with cognitive and brain changes, many older adults continue to function adequately until they are very old (Jacobs et al., 2009). The older human brain still has the capacity to adapt to physical, cognitive and social environment challenges, while facing a decline in sensory-motor and cognitive abilities.

Physical Activity Training and Aging

“Physical activity (PA) is an umbrella term describing a multitude of activities associated with purposeful body movements. “

Physical exercise reduces chronic oxidative stress (increased mitochondria biogenesis and autophagy up-regulation) and stimulates the synthesis of neurotransmitters and trophic factors [13]. Both these neurochemical phenomena contribute to neuroplasticity.”

The authors of the Cochrane review on the effects of PA on cognition in elderly individuals (Angevaren et al., 2008) concluded that there are beneficial effects of regular physical exercise on cognitive function. The authors identified eleven randomized controlled trials fulfilling appropriate quality standards. Eight of the eleven trials showed beneficial effects of regular physical exercise.”

Dancing and Aging

- Goals of Healthy Aging:
- Maintaining physical and cognitive abilities and fitness.
- “Dance, in addition to physical activity, combines emotions, social interaction, sensory stimulation, motor coordination and music, thereby creating enriched environmental conditions for human individuals.”

“Positron emission tomography (PET) has been shown recently that dancing elicits multisite brain activations (Brown et al., 2006) implicating the involvement of wide-spread interacting brain networks.”

Dancing and Healthy Aging

- Dance vs. exercising, walking or playing an instrument
- Dance combines:
  - physical activity, social and emotional interaction, each documented to have beneficial effects.
- Dance: high compliance.

Our study provides strong evidence that dance promotes a wide-range of beneficial effects that are not limited to motor behavior, posture and balance, but covers also perceptual and cognitive abilities. Therefore, dance might be an appropriate approach for enforcing and maintaining plasticity processes in elderly populations, thereby contributing to successful aging.

The types of dance did not seem to make a different with regard to cognition and physical fitness.

“Broad range of different types of dance, ranging from folklore dance, through tango to salsa and jazz, showed beneficial effects (Alpert et al., 2009, Coubard et al., 2011, Currie et al., 2012, Dechamps et al., 2010, Fosshage, 2004, Granacher et al., 2012, Gray, 2008, Heiberger et al., 2011, Keogh et al., 2009, Kim et al., 2011, Koch and Bräuninger, 2005 and Sevdalis and Keller, 2011).”

“The findings suggest that dance, regardless of its style, can significantly improve muscular strength and endurance, balance, and other aspects of functional fitness in older adults. Future researchers may want to analyze the effects of dance on mental health and explore ways to make this intervention attractive to both genders. Standardizing outcome measures for dance would facilitate meta-analysis. “

Aerobic and Non-aerobic exercise and Cognition in Older Adults

- “Aerobic exercise can be quantified by amount of energy expenditure expressed in metabolic equivalents”
- Non-Aerobic exercise--coordination, stretching, and resistance training—hard to quantify
- “Research to date concludes that all forms of exercise have shown to have effects on cognitive function of older adults (Hötting and Röder, 2013).”

Falls and the Elderly

- One-third of people older than 65 years fall at least once a year.
- Many programs try to improve physical fitness and gait with the aim of preventing falls in older adults.
- Efficacy of physical exercise programs in preventing falls may be raised further by adding cognitive training components.
- Various cognitive domains, including attention, executive function, information processing, and reaction time, are related to balance, gait, and fall risk.

Study: Cognitive training while exercising

- Elderly persons older than 70 years and without cognitive impairment
- 1) virtual reality video game dancing (DANCE)
- 2) treadmill walking with simultaneous verbal memory training (MEMORY), or
- 3) treadmill walking (PHYS). Each program was complemented with strength and balance exercises.
- Two 1-hour training sessions per week over 6 months were applied. Gait variables, functional fitness (Short Physical Performance Battery, 6-minute walk), and fall frequencies were assessed at baseline, after 3 months and 6 months, and at 1-year follow-up. Multiple regression analyses with planned comparisons were carried out.

Simultaneous cognitive-physical training components: video game dancing (A) and treadmill memory training (B).
Study: Cognitive training while exercising

- Simultaneous cognitive-physical training
- and the exclusive physical exercise program
- Both counteract age-related decline of physical functioning in the elderly persons, while possible advantages of simultaneous cognitive-physical interventions are well worth further investigation.
- Showed improved gait ($P<0.05$), functional fitness ($P<0.05$), and reduced fall frequency (−77%, $P<0.001$).
- Only single-task fast walking, gait variability at preferred walking speed, and Short Physical Performance Battery were reduced at follow-up (all $P<0.05$ or trend).

Conclusion:

- Long-term multicomponent cognitive-physical and exclusive physical training programs demonstrated similar potential to counteract age-related decline in physical functioning.

Rhythmic movements are the basic elements of music and dance.

- Rewards and emotions are evoked by the production, perception and synchronization of the rhythmic movements. (both Wang)
- Historical and cross-cultural ubiquity, its continued importance in everyday life and its impact on the emotions of listeners and performers.

Uniqueness of Music

- If human perceptual skills are not at the root of the uniqueness of music, what other factors might be implicated? Those related to social interaction are promising candidates. Humans are intensely social creatures, and music is largely a social endeavor. Even solitary music listening, which emerged with the advent of recording technology, evokes feelings that are embedded in a social context. (Trehub)
Music and Infants and Positivity

- “Infants are keenly responsive to social stimuli—human faces as well as voices—especially when they reflect positive emotional states. For infants, the power of music may arise from its social nature and its link to positive emotions.”

Dance Musical Theatre

- Why so enjoyable?
- American in Paris—costumes, synchrony—noted when out of synchrony; music accompanying the dance.
- Feelings—exhilaration—entrainment with other audience members—Excitement is catchy—positive/negative.
- It makes me want to move—seeing them jump and spin, and smile, and enjoy. They become the characters.
- Comparable physical and emotional synchrony is often attained by highly engaged audiences at rock concerts, soccer matches and protest rallies.

Trehub, SE.
Different types of Dance
Different Dance Offerings

- Aerial
- Ballet
- Ballroom Dance
- Belly Dance
- Bollywood Dance
- Bokwa
- Contemporary Dance
- Dance Fitness
- Exotic Dance
- Hip Hop Dance
- Hustle
Different Dance Offerings—(cont’d)

- International
- Jazz Dance
- Latin Dance
- Modern Dance
- QiDance
- Salsa
- Step
- Swing
- Tango
- Tap
- Zumba
Tap Dancing
Yangko Dancing
Belly Dancing
Kathak—Indian Dance
Gagnam Style
Break Dancing
Line Dancing
Salsa

- Salsa is a syncretic dance genre from Cuba. Salsa is normally a partner dance, although there are recognized solo forms. Salsa is usually danced to the salsa music although most people perform the steps with Latin American music as well. Salsa requires a couple, although you can choreograph it as a form of line dance in which a partner might not be necessary. You can perform salsa as an improvisation but generally it is choreographed. This dance style is very popular throughout the Latin America and over time it spread through North America, Europe, Australia, Asia and the Middle East.

From Couch Potato to ...
Hot Potato!!!
Proper Footwear for Aerobics, Dance Fitness

- Sufficient cushioning and shock absorption
- Medial-lateral (side-to-side) stability.
- Permit twisting and turning
- Thick upper leather or strap support to provide forefoot stability and prevent slippage of the foot
- Toe Box High
- No running shoes (treds-can stick to floor; no side to side stability)
Prescription for your patients

- How much—Preparticipation Physical Exam—evaluate your patients, stress test if needed.
- How long: start slow, baby steps, and increase incrementally and as tolerated—the ‘Talk Test’—
- How intense? Encourage moderate intensity to start—30 min aerobic 5x/week, can be broken up in 10 min intervals; Advance as tolerated and safe to vigorous, and depending on health issues and goals.
- With a group or alone
MUSCULOSKELETAL HEALTH QUESTIONNAIRE

1. Have you had to see a doctor in the past three years for any bone, joint, or spine problem?
   - No
   - Yes, one or two visits, but no problems now
   - Yes, doctor gave prescribed anti-inflammatory medication

2. Have you ever had an orthopedic injury severe enough to result in any of the following?
   - Required surgery
   - Required crutches or use of a walker
   - Required medication
   - No
   - Yes

3. Have you ever dislocated or separated a shoulder?
   - No
   - Yes
   - If yes, please specify

4. Do you have joint swelling?
   - No
   - Yes

5. Have you lost mobility (range of motion) in any joint? For example, can you fully straighten (extend) and fully bend (flex) your elbow?
   - No
   - A little stiff at times, but motion is full
   - Motion is limited in one or two major joints or the spine

6. Do your knees creak or make noise when you are going up or down stairs?
   - No
   - Yes, but not Ostol or pain
   - Yes, and does cause discomfort and/or pain

7. Do you have trouble physically ascending or descending stairs?
   - No
   - Only after going up and down multiple times, especially while carrying heavier items
   - Yes

8. Do you have stiffness in any joints associated with any of the following conditions?
   - Arthritis
   - Osteoarthritis
   - Rheumatoid arthritis
   - No
   - Yes, today only
   - Yes, more than two days

9. Do you have high blood pressure or is your blood pressure often high?
   - Yes

10. Do you have pain while lying on either side at night in bed?
    - No
    - Yes
    - Pain wakes me up

11. Do you have a history of broken bones?
    - Yes
    - Yes

12. Do you have trouble sleeping at night or feel tired during the day?
    - No
    - Yes

13. Do you have difficulty getting up in the morning or at night because of joint or muscle discomfort?
    - No
    - Yes

Note: If you answer “Yes” to any of these items, this may suggest a musculoskeletal issue that warrants further evaluation. Be sure to refer to an appropriate healthcare professional as needed.
What is the Best Exercise for Me?

Take the “Work” Out of Workouts with a Fitness Plan that “Fits” You

- A program that fits your lifestyle, including activities you love, so you can stick with it for a long time.
- A well-rounded program with aerobic, strength training, and balance exercises.
- A program that starts with your current level of fitness and takes into account any previous injuries or current limitations.
- A program that keeps your routines fresh and keeps you motivated.

Exercise—alone, group, adherence

- Alone vs. Group
- Motivation
- Adherence
Resources:

- Parkinson’s dance—video organization
- Dance4health.org
- Wheelchair dancing—www.wheelchairdancers.org
- http://dizzyfeetfoundation.org/national-dance-day/
- Healthy Steps Lebed Method (gohealthysteps.com)—for general wellbeing and for people with chronic diseases, cancer survivors
- http://www.adta.org/about_dmt (Dance Movement Therapy)
Dance your way to Health!!