# World Table Tennis for Health Congress (WTT4HC), Crete, Greece

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# World Table Tennis for Health Congress (WTT4HC), Crete, Greece

## PROGRAMME

### DAY 1 – FRIDAY, NOVEMBER 3RD 2023

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<tr>
<th>Time</th>
<th>Session</th>
<th>Speakers</th>
</tr>
</thead>
<tbody>
<tr>
<td>15:30</td>
<td>Welcome</td>
<td>Xenia Stathi, Hellenic Table Tennis Association (HTTF)</td>
</tr>
<tr>
<td>15:45</td>
<td>Opening Remarks</td>
<td>Leandro Olvech, ITTF Foundation</td>
</tr>
<tr>
<td>16:15</td>
<td>TT4Health field of play: Effects of active participation in a sport like TT</td>
<td>Moderator: Miran Kondrič, ITTF Scientific Committee&lt;br&gt;Themis Kokolakakis, [Online] Sheffield Hallam University, Sport Industry Research Centre&lt;br&gt;Pavlos Poturidis, HERAKLION ALLIANCE FOR ALZHEIMER’S DISEASE AND HEALTHY AGING&lt;br&gt;Daniel Rodriguez, [Online] Sense4Care</td>
</tr>
<tr>
<td>17:00</td>
<td>Networking Coffee Break</td>
<td>Renato Walkowiak, Ping4Alzheimers</td>
</tr>
<tr>
<td>17:30</td>
<td>Implementing TT4Health: Insights into ongoing TT4Health projects</td>
<td>Francesca Vargas Schebesta and Antonino Barbera, [Online] Neuropong&lt;br&gt;Trent McLean, [Online] Ping Pong for Good&lt;br&gt;Polychronis Politis (with Christos Gkoumas) Psychologist, National Coach of Parkinson’s Table Tennis Greek Team</td>
</tr>
<tr>
<td>18:45</td>
<td>Summary and Closing of Day 1</td>
<td>Khushal Palicha, ITTF Foundation</td>
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</table>
Table Tennis for Health

Paul Potouridis

Preventing Alzheimer with Table Tennis
• The effectiveness of non-pharmaceutical treatments in dementia and Mild Mental Disorder (MLD) is a question of many modern researches.

• All neuroscientists cite exercise, family caregiver interventions, sensory stimulation, and reminiscence therapy as the most commonly recommended non-drug treatments for people with mild to moderate dementia.
• No one can deny that even physical exercise of moderate intensity contributes decisively to maintaining our physical condition and protecting our health.
• The benefits of exercise have been known for decades and affect all populations.
All over the world millions of people play table tennis for many reasons.
At the park
outdoor activity
• It's fun, fast and has great health benefits. It can be enjoyed by people - even sedentary people - of all ages and fitness levels, due to the low risk of injury.

• It improves reflexes, hand-eye coordination and balance, while toning and strengthening muscles in the upper and lower body.
• In addition - due to the nature of the sport - it strengthens the motor and visual coordination of the athlete as he constantly observes the movement of the ball.

• In addition to physical exercise it is also a great mental task. You plan strategies and those decisions have to be made for split of a second.
This increases concentration levels and decision-making ability. All this mental exercise increases hormone levels and keeps the brain young, thus slowing the progression of cognitive decline that contributes to healthy aging.
It's not just a good cardiorespiratory workout, but it's also a very good aerobic workout.
You don't need to look like an athlete to play T T, athletic appearance is not necessary.
Also known as "high-speed chess"

• With a game of table tennis the overall state of awareness is stimulated and requires thought and physical alertness.

• Numerous studies have shown that table tennis activates different areas of the brain simultaneously.
Day Care Center (England)
Day Care Center (USA)
Day Care Center (Heraklion Greece)
• A 1997 clinical study in Japan found that people with brain disease who played table tennis experienced a boost in brain function and awareness, as well as a reduction in dementia and depression.

• Patients who completed a ping pong rehabilitation program also tended to be less dependent on wheelchairs.
It was found that older table tennis players tend to experience functional improvements in the frontal lobes of the brain, which regulate

- decision-making,
- problem-solving and
- voluntary movements.
The game of table tennis is now recommended as a method of preventing Alzheimer's disease and enhancing the treatment of dementia.

Takao Yamasaki
Specifically

- Increases concentration and alertness.
- Increases thinking and reaction speed.
- It stimulates brain function.
- Develops tactical thinking skills.
- Develops hand-eye coordination and balance.
- Provides aerobic exercise.
- It provides social interaction and recreation.
Our non-profit association "Solidarity" with its program: "Preventing Alzheimer's by playing table tennis" as a non-drug intervention has two main goals:

1) Conduct further research studies highlighting the potential benefits of playing table tennis for people with Alzheimer's disease.

2) Development of special equipment (ping-pong accessories, tables, rackets etc.) at our club's facilities to help patients with Alzheimer's disease.
Special equipment-accessories
Special equipment-accessories
Coordination games
Demonstration in town
Demonstration in town
Demonstration in town
The programs that combine movement and mental exercise are a holistic non-drug treatment, offering biological, psychological and social reinforcement.
In any case, physical exercise in general and the sport of table tennis in particular is an accessible means of improving and protecting health, so it is good to encourage older people who show the first signs of mental decline to exercise more.
Table Tennis ... The best brain sport!

LIVE LONG PING PONG

Thank you
Bibliography - references


2) Μαγδαληνή Τσολάκη, MD, PhD  Alzheimer: Νέες διαστάσεις στην προσέγγιση της νόσου.

3) Matthew Kempton, Dr, Senior Lecturer King College

4) Daniel Amen, Dr, Psychiatrist, SAEF program

5) Michal Schnaider Beeri, PhD, Laura Middleton, PhD  Being physically active may protect the brain from Alzheimer disease.

6) Wendy Suzuki, Dr, Professor of Neural Science and Psychology, NY Univercity

7) Marian Diamond, professor of anatomy, Univ. California Berkeley

8) Rob Bernstein, Teachers College of Columbia Univercity.

9) Takao Yamasaki, Benefits of Table Tennis for Brain Health Maintenance and Prevention of Dementia
STAT-ON and Table Tennis

WTT4HC-TT4Health field of play: effects of active participation in a sport like TT
OUR STORY
From research to industry

Year Of Existence
We have transferred our research knowledge in Parkinson’s and AI to industry.

15+

Barcelona, Spain
BACKGROUND

What's the issue?

PD monitoring relies on:

01 Punctual and short clinical evaluations

02 Subjective questionnaires & chaotic diaries

Global claim for new technologies!
- Objective information
- Distribution and severity of symptoms
- Information in daily life activities
STAT-ON
Connecting clinicians to patients by just a holter

STAT-ON is a medical device that provides objective information about severity and distribution of motor symptoms in patients with Parkinson’s Disease in daily life.
STAT-ON
The state of the art for PD monitoring

STAT-ON uses several advanced machine learning algorithms

- Motor Fluctuation Identification
- Detection of Dysk and Brady.
- Freezing of Gait Episodes
- Advanced Symptoms Detection
- First Fluctuations in Early Patients
- Motor Activities Monitoring
- Therapeutic Adjustments

- Rigorous methodology (European projects, scientific methods)
- Largest inertial and labelled video recorded database with PD patients in the world
- Each algorithm methodology is published and validated with new data
WHY ON THE WAIST?

- Close to the centre of human body
- Ability to monitor all the motor symptoms
- Not subject to random movements
- High usability
MONITORING DEVICES

Too many random movements (FP)

From the wrist, it is lost a lot of info happening on the rest of the body (FN)

Uncomfortable

Due to set up complexity, databases use to be very small, not generalizing enough the symptoms
## General summary

| **User ID:** | 4 |
| **Age:** | 72 |
| **Hoehn & Yahr:** | 2.0 |
| **Study start:** | 21/02/2022 |
| **Study end:** | 01/03/2022 |
| **Days monitored:** | 9 |
| **Time Monitored:** | 97 hours |

| **N° FoG Episodes:** | 28 |
| **Average FoG Episodes/day:** | 3.1±2.3 |
| **Average minutes walking/day:** | 87.4±38 |
| **Average number of steps/day:** | 9783.6±4389.1 |
| **Motor inactivity (% time monitored):** | 20.5 hours (21.1 %) |
| **Total Time in OFF (% time monitored):** | 35.5 hours (36.6 %) |
| **Total Time in Intermediate (% time monitored):** | 16.5 hours (17 %) |
| **Total Time in ON (% time monitored):** | 24.5 hours (25.3 %) |
| **Total Time with dyskinesias (% time monitored):** | 27.5 hours (28.4 %) |
| **Bradykinesia index (Stride fluidity) >8.5 optimal; <6.5 suboptimal** | 6.6±0.4 |
The report

Main parameters of the graph:

- **Green**: ON motor state
- **Red**: OFF motor state
- **Yellow**: Intermediate motor state
- **Purple**: dyskinesia
- **Grey**: motor inactivity
- **Black dot**: a freezing of gait episode
- **Black line**: event. The sensor’s button was pressed
- **Blue Line**: fall

<table>
<thead>
<tr>
<th>Sensitivity</th>
<th>Specificity</th>
</tr>
</thead>
<tbody>
<tr>
<td>95%</td>
<td>96%</td>
</tr>
<tr>
<td>ON-OFF</td>
<td>DYSKINESIA</td>
</tr>
<tr>
<td>95%</td>
<td>95%</td>
</tr>
<tr>
<td>92.5%</td>
<td>89.1%</td>
</tr>
<tr>
<td>BRADYKINESIA</td>
<td>FoG</td>
</tr>
<tr>
<td>94%</td>
<td>92%</td>
</tr>
</tbody>
</table>
STAT-ON Guidelines

**OFF Hours**

- Bradykinesia severity (stride fluidity)

**FoG Episodes**

- Weekly Summary of FoG of the patient
- Weekly Summary of Bradykinesia index of the patient

**Clinical evaluation guideline**

- Average FoG episodes per day
- Water security
- OFF may (time reached text)
- Total time with Dys (time measured text)
- ON time (time measured text)
- Bradykinesia Index (motor feature)
- ON states
- OFF states
- Bradykinesia
- Meeting of start

**Clinical evaluation guideline**

- Average FoG episodes per day
- Water security
- OFF may (time reached text)
- Total time with Dys (time measured text)
- ON time (time measured text)
- Bradykinesia Index (motor feature)
- ON states
- OFF states
- Bradykinesia
- Meeting of start
USE CASES

Therapeutic adjustments: Pre-post

SOURCE: UPARKINSON-TEKNON-GH QUIRÓN. Bayès A. and Caballol N.

Pre-intervention
July

Reduction of OFF state to less than 2 hours a day in average
Dyskinesia keeps the same severity.

Post-intervention
5 months later
ADVANCED PD
Therapeutic adjustments: Apomorphine pump

SOURCE: Vall D’Hebron Hospital. Dr. Hernandez Vara J.

Apomorphine <1mg/h.
Apomorphine 3mg/h.
A PRE-POST DUODOPA EXAMPLE

General summary

<table>
<thead>
<tr>
<th>USER ID: 88</th>
<th>USER ID: 88</th>
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<tbody>
<tr>
<td>AGE 70</td>
<td>AGE 71</td>
</tr>
<tr>
<td>H&amp;Y: 3.0</td>
<td>H&amp;Y: 3.0</td>
</tr>
<tr>
<td>October 2022</td>
<td>February 2023</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pre-Duodopa</th>
<th>Post-Duodopa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Several dyskinesias</td>
<td>Significant increase in Bradykinesia Index</td>
</tr>
<tr>
<td>Low Bradykinesia Index</td>
<td>Decrease of Dyskinesia from 28% to 16%</td>
</tr>
</tbody>
</table>

| N° FoG Episodes: | | N° FoG Episodes: | |
|-----------------|-----------------|
| Average FoG Episodes/day: | 1.8±1.9 |
| Average minutes walking/day: | 125.8±48.4 |
| Average number of steps/day: | 31910.6±5020.9 |
| Motor inactivity (% time monitored): | 25.5 hours (21.9 %) |
| Total Time in OFF (% time monitored): | 14 hours (12 %) |
| Total Time in Intermediate (% time monitored): | 24.5 hours (21 %) |
| Total Time in ON (% time monitored): | 52.5 hours (45.1 %) |
| Total Time with dyskinesias (% time monitored): | 32.5 hours (27.9 %) |
| Bradykinesia index (Stride fluidity): | 6.3±0.7 |
| Bradykinesia index (Stride fluidity): | 7.9±0.5 |
A PRE-POST DUODOPA EXAMPLE

Bradykinesia index

Pre-Duodopa

Post-Duodopa
And Tennis Table?

Extremely low scientific evidence

The experience of many patients with PD tells that Table Tennis is an activity that improves their symptoms!!!
A case study
World Parkinson Congress Framework
A case study

In what consists the pilot?

01. In June 5 patients used STAT-ON for 1 week

02. In the WPC, ITTF Foundation has organized a session for training patients during 1h and a half

03. The patients wore the sensor in the evening and also in the morning next day
Results
Population and Limitations

5 Patients have participated (4m/1w; 53.6yo)
Patients are in mild/moderate stages

Limitations of the study

• 2 of them had played ping-pong before
• The conditions of measurement after the training are not activities of daily living.
• 5 patients are not enough to provide significant results
• Only one session might not be enough to demonstrate the benefits of ping-pong
# Results

## Individual results

<table>
<thead>
<tr>
<th>PATIENT 1</th>
<th>PATIENT 2</th>
<th>PATIENT 3</th>
</tr>
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<tbody>
<tr>
<td><strong>FoG Average (Num ep/day)</strong></td>
<td>0,2</td>
<td>0,2</td>
</tr>
<tr>
<td><strong>Steps/Day</strong></td>
<td>4236,8</td>
<td>2964,3</td>
</tr>
<tr>
<td><strong>Inactivity (%)</strong></td>
<td>39,5</td>
<td>70,3</td>
</tr>
<tr>
<td><strong>Time OFF (%)</strong></td>
<td>3,7</td>
<td>0</td>
</tr>
<tr>
<td><strong>Time ON (%)</strong></td>
<td>53,7</td>
<td>8,1</td>
</tr>
<tr>
<td><strong>OFF + Inactivity</strong></td>
<td>43,2</td>
<td>70,3</td>
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<tr>
<td><strong>Time Dyskinesia (%)</strong></td>
<td>24,1</td>
<td>3,6</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>PATIENT 4</th>
<th>PATIENT 5</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FoG Average (Num ep/day)</strong></td>
<td>2,4</td>
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<tr>
<td><strong>Steps/Day</strong></td>
<td>10536</td>
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<tr>
<td><strong>Inactivity (%)</strong></td>
<td>24,9</td>
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<tr>
<td><strong>Time OFF (%)</strong></td>
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<tr>
<td><strong>Time ON (%)</strong></td>
<td>56,3</td>
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<tr>
<td><strong>OFF + Inactivity</strong></td>
<td>27,9</td>
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<tr>
<td><strong>Time Dyskinesia (%)</strong></td>
<td>4,6</td>
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</table>
Results!!!

<table>
<thead>
<tr>
<th>Metric</th>
<th>Average</th>
</tr>
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<tbody>
<tr>
<td>FoG Average (Num ep/day)</td>
<td>-0.52</td>
</tr>
<tr>
<td>Steps/Day</td>
<td>-380.88</td>
</tr>
<tr>
<td>Inactivity (%)</td>
<td>-10.64</td>
</tr>
<tr>
<td>Time OFF (%)</td>
<td>0.8</td>
</tr>
<tr>
<td>Time ON (%)</td>
<td>6.9</td>
</tr>
<tr>
<td>OFF + Inactivity (%)</td>
<td>-9.84</td>
</tr>
<tr>
<td>Time Dyskinesia (%)</td>
<td>-1.86</td>
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</table>
Conclusions

01. There is a clear improvement in general, but limitations of the study could have affected.

02. Patients have improved the ON time and decreased inactivity but there are less number of steps per day.

03. Time in OFF is the same but the inactivity before could be off, leading to a possible important reduction in OFF time, which means better mobility.
THANKS FOR YOUR ATTENTION!!!

Contact: Daniel.rodriguez@sense4care.com
• How did it start?
• Why table tennis?
Dementia around the world

55 Million

Datas : WHO - Dementia International
Dementia around the world

55 Million

2023

153 Million

2050

Datas: WHO - Dementia International
Dementia around the world

1.3 Trillions USD

There is no medication & no treatment

2019

Datas : WHO
We love to play Table tennis
Design of the program with the collaboration of a psychologist and a physiotherapist
PHYSICAL ACTIVITY

Scientifically proven
COGNITIVE STIMULATION

Scientifically proven
SOCIAL INTERACTIONS

Scientifically proven
Key points of Ping4Alzheimer

PHYSICAL ACTIVITY

COGNITIVE STIMULATION

SOCIAL INTERACTIONS
2019

Ensure healthy lives and promote well-being for all at all ages
Adapted to each patient profile
A friendly and sharing moment for caregivers
Reconnection between family members
Improves concentration
More than table tennis

- Non-drug therapy
- Content adapted to the different stages of the disease
- A work of mental anchors and memorization
- Balance games to delay loss of autonomy
The whole table tennis family will fight Alzheimer's together

Renato Walkowiak
Ping4Alzheimer@gmail.com
Ping4Alzheimer.com
Table Tennis as form of rehabilitation for people with neurodegenerative conditions.

Antonio Barbera, MD
- Clinical Professor, Ob-Gyn, School of Medicine, Anschutz Medical Campus
- Movement Disorders Center, School of Medicine, Anschutz Medical Campus
- International Parkinson and Movement Disorder Society

Francesca Vargas
- 2021 Peruvian National Champion
Neurodegenerative Conditions

Multiple Sclerosis:
- 1 M people in the United States - 2.1 M people worldwide
- Every day 300 people in the world receive a diagnosis of MS
- Every 5 minutes someone in the world is diagnosed with MS every

Parkinson’s Disease:
- The second most common neurodegenerative condition
- 1 M in the US today, 1.2 M by 2030 - 10 M people worldwide
- Each year 60,000 Americans are diagnosed with Parkinson’s
- The incidence of PD in Colorado in 2018 was 11,500 people

Alzheimer’s:
- The most common neurodegenerative condition
- 6.2 M in the US today - 55 M people worldwide
- 1 in 3 senior dies with Alzheimer’s or other dementia
- Life time risk at age 45: W 1 in 5; M 1 in 10.
Antonio Barbera

Multiple Sclerosis (MS)
MS Hug and … Table Tennis
Neurogenesis and Neuroplasticity

* The brain’s ability to reorganize itself by forming new neural connections:
  - new cells (neurogenesis)
  - new connections (synaptogenesis)
* Synaptic restructuring:
  - new shape
  - new function
* Mechanism(s) by which the brain encodes experience and learns new behaviors.
* Mechanism(s) by which the damaged brain relearns lost behavior in response to rehab/exercise.
Welcome to a place where everybody can connect around a ... blue table!

501(c)(3) Non-profit Organization
The NeuroPong™ Program

- Table tennis program designed for and tailored to people with neurodegenerative conditions.

- It is a novel form of neurological therapy to be offered at any stage of their condition.

- Improve both motor and motor symptoms plus cognitive function.
DURING MY DIAGNOSE OF MULTIPLE SCLEROSIS

Francesca Vargas
Francesca Vargas

AFTER MY DIAGNOSE OF MULTIPLE SCLEROSIS
Neurodegenerative Conditions

Interventions to Possibly Reduce Risk...
Research suggests combining multiple healthy factors may be the most impactful

Physical Activity
Cognitive & Social Stimulation
Healthy Diet

MS and Exercise

Exercise and physical activity can improve many motor and non-motor Parkinson’s symptoms:
Aerobic Activity
Strength Training
Balance, Agility & Multitasking
Stretching
The neuroplastic effect of exercise in PD

Vuckovic, Petzinger et al. Movement Disorders 2010
Exercise increases regional brain blood flow.

Vuckovic, Petzinger et al. Movement Disorders 2010
Ping Pong for Parkinson’s: A novel table tennis exercise program reduces barriers to exercise for people with Parkinson’s Disease.

Matthew J. Woodward MD,1 Antonino Barbera MD,1,2 Saurabh Mishra,3 Francesca Vargas Schebesta,2 Isabelle Buard PhD,1 Jeanne Feuerstein MD,1

1. University of Colorado School of Medicine; 2. Table Tennis Connections; 3. ITTF Foundation
NeuroPong™: Parkinson’s
ITTF Foundation Table Tennis
For Health World Congress
11/03/2023
OUR FOUNDERS

Maureen McComsey is a social impact strategist with over two decades of experience. Recognizing the incredible potential of ping pong as a catalyst for brain health and healthy aging, she launched Ping Pong for Good to raise awareness about its myriad benefits for people living with neurological conditions, neurodivergence and healthy aging. With her expertise in social innovation and an unwavering dedication to positive change, Maureen and her co-founder, Trent MacLean, are leading a movement utilizing ping pong as a tool to optimize brain and body health.

Trent MacLean is an expert in the apparel and retail industry, bringing a wealth of experience as the co-founder of Ping Pong for Good on multiple fronts. In 2011, Trent received a life-changing diagnosis of Parkinson’s Disease, after experiencing symptoms for over 30 years. He attributes his rigorous and consistent exercise program, including ping pong, to effectively managing its symptoms. With his unique perspective and unwavering determination, Trent plays a vital role in shaping the vision of Ping Pong for Good, providing hope and inspiration for individuals affected by Parkinson’s and other neurological conditions.
ABOUT PING PONG FOR GOOD

Ping Pong for Good is a movement utilizing ping pong to optimize brain and body health.

Mission: To improve the quality of life for those living with brain diseases and to promote healthy aging.

Vision: The widespread adoption of table tennis as a therapeutic, fitness and community activity.

Value Proposition: Expand the use of ping pong as an activity outside its recreational and competitive use. PPG Fitness enables people to play at Table Tennis Clubs, Community Centers, Retirement Homes, Physical Therapy Centers, Gyms, multi-use spaces, and more!
OUR THREE KEY OBJECTIVES

Increased awareness about the importance of exercise + brain health and the therapeutic benefits of playing ping pong

Increased Accessibility through our proprietary PPG Fitness program that offers a ping pong exercise protocol that is not only effective and science-backed but also safe and fun

Clinical research to validate the efficacy of this program and its positive impact on the well-being of people living with Parkinson’s
Our Expert Team

Advisory Member
Melita Petrossian, MD, Neurology

Director of Table Tennis
Alex Figueroa
Sport & Competition Consultant, ITTF Certified Table Tennis Coach

Director of Programming
Ryan Glatt, MSc. Applied Neuroscience NSCA-CPT

Director of Fitness
Corwin Patis, PT, DPT, CEEAA, LSVT-BIG, CSCS

Expert Advisor
Luba Sadovska, ITTF PTT Certified Table Tennis Coach

Expert Advisor
Bernard Baski, Founder TrifitLA Fitness and Elite Athlete Coach
PPG FITNESS PROGRAM

• PPG Fitness has been developed by a cross-functional team of experts in neurology, physical therapy, elite fitness, table tennis, and people with Parkinson's (PWP) to optimize benefits for the body and mind and to improve table tennis skills.

• A 75-minute PPG Fitness class incorporates ping pong, basic drills, and gameplay to improve motor and cognitive fitness while improving basic ping pong playing skills.

• It includes bodyweight exercises and drills that take place on and off the ping pong table.

• Our classes are designed to promote healthy aging and to help reduce symptoms and slow the progression associated with neurological conditions, with an initial focus on Parkinson's.
Participants have reported remarkable improvements in their physical and emotional well-being.
Our comprehensive instructor training platform, certification, and ongoing support will ensure that PPG Fitness Training is delivered effectively, efficiently, and consistently.

It includes webinars, learning aids and live online training that is intended for all coaches, trainers, therapists, assistant coaches, and volunteers to prepare them for their role in leading or facilitating in-person PPG Fitness sessions.

Program certification will be followed by annual updates and renewals.

Feasibility Study – 12 Weeks

Phase One: Program Development, PPG Fitness Instructor Certification and Feasibility Study

Phase Two: Research Study and Product Expansion

Comprehensive Research Study

PPG Therapy for one-on-one training for less mobile, high fall risk participants.

On-line group training program

Customized one-on-one virtual training
Connect with us!

pingpongforgood.org
@pingpongforgood

For more information, contact Maureen McComsey
Tel. 213-433-6547
Email: Maureen@pingpongforgood.org
Table Tennis 4 Health (TT4HEALTH):
Exploring Its Past, Present, and Future, From Theory to Practice

Christos Gkoumas
Cognitive Neuroscientist

Polychronis Politsis
Psychologist
National Table Tennis Coach (Parkinson’s Team)
Board Member H.P.C.A.

World Table Tennis for Health
3-4 November, 2023
Sports have positive effects on cognitive abilities (neuroplasticity, 1)
Table tennis & Brain Health

“Table Tennis enhances cognitive functions unlike any other sport”

Wendy Suzuki, New York University

Motor Behavior (primary motor cortex, 5)

Strategy/Planning (prefrontal cortex, 5)

Learning - Memory (Hippocampus, 5)
Table Tennis & Physical Health

Elderly (3, 7):
- Higher bone density/lean mass
- Improved values in blood tests (good/bad cholesterol, triglycerides) related to cardiovascular diseases.

Patients with Parkinson’s followed a pilot table tennis therapy program for 6 months (6 hours/week) with positive effects in their motor symptoms (non-motor remain unchanged, 2)

A metanalysis (8) concluded that physical activity reduces the dementia risk by 28% and the risk of Alzheimer’s dementia up to 45%. No systematic evidence about table tennis (7).
Table tennis as a tool for promoting healthy and active lifestyles

"A Holistic Approach to Athletes with Disabilities Through Table Tennis" - Panhellenic Athletic Association for the Physically Disabled 2013

Biopsychosocial approach

(Neuro)Psychology Unit
Coaching Unity
Occupational Therapy Unit
Physiatry Unit
Gymnastics Unit

Gkoumas & Politis Model
for teaching table tennis to people with Cerebral Palsy and other neurological conditions
Gkoumas & Politsis Model (2013)

- Haptic Perception
- Auditory Perception
- Visual Perception

Short-term memory

Action (Repetition)

Self-talk

Long-term memory (mainly implicit)
Table tennis as a tool for promoting mental health

• Increased Social Interaction: Promotes greater social interaction and integration, especially among marginalized groups. (5)

• Enhanced Sense of Belonging: Strengthens the sense of belonging to a team or community, fostering a supportive environment. (5)

• Promoting Sportsmanship: Encourages good sportsmanship, values, and principles, emphasizing non-violent sport and positive character development. (5)
The role of the coach in therapy table tennis programs

- Coach is not alone, but is part of a diverse team of professionals.

- The athletes are the primary sources of information. They know their condition, their strengths and weaknesses better than anyone. Let’s listen to them!

- Groups of 6 athletes each (for more athletes assistant coaches are required).

- A therapy table tennis program should include simple training exercises (handling the paddle, hitting the ball in playful exercises, etc.) which become more complex over time, depending on the skills, interests and individual differences of the athletes.

- The ultimate goal: enjoy the sport and improve quality of life!
Warm-up Exercises

• Jogging and Walking: 5 minutes

• Physical Exercises and Stretching: 3 minutes

• Short Break and Hydration: 2 minutes
Racket and Ball Handling Exercises

• **Exercise 1a:** Bouncing the Ball on the Table with Forehand (3 minutes)
  **Goal:** Achieve 100 consecutive bounces with a single attempt

• **Exercise 1b:** Bouncing the Ball on the Table with Backhand (3 minutes)
  **Goal:** Achieve 100 consecutive bounces with a single attempt

• **Short Break and Hydration (2 minutes)**
**Forehand and Backhand Exercises**

• **Exercise 2a:** Forehand Ball Placement (6 minutes)
  
  **Objective:** Hit the ball diagonally or parallel to the red marks on the table
  
  **Goal:** Successfully place 50 balls on the red marks

• **Exercise 2b:** Backhand Ball Placement (6 minutes)
  
  **Objective:** Hit the ball diagonally or parallel to the red marks on the table
  
  **Goal:** Successfully place 50 balls on the red marks
Multi-ball Exercise

- Subsections:
  - Exercise 3a: Forehand Practice (3 minutes)
  - Exercise 3b: Backhand Practice (3 minutes)
  - Exercise 3c: Combination of Forehand and Backhand (3 minutes)
- Short Break for 1 minute after every 30 balls
- The frequency may vary based on individual skills and symptom severity.
Real Match Experience

• **Exercise 4: Enjoying the Sport through Interactive Matches (60 minutes)**
  Engage in recreational games, fostering enjoyment and skill development. Allow for short breaks if required during the 60-minute game session.
Practical Demonstration: Table Tennis Exercises in Action
Empowering the Future: Building a Supportive Table Tennis Community for NDDs*

Existing cases

Japan Ping Pong
Parkinson
Japan Table Tennis Therapy Association

Development of a trans(national) Table Tennis Therapy Programme for NDDs

Outreach & support
Facilities
Research
Specialized training

*NDDs = NeuroDegenerative Diseases
Thank you!

Christos Gkoumas
chrgkoumas@gmail.com

Polychronis Politsis
ppolitsis@yahoo.gr
Literature


## DAY 2 – SATURDAY, NOVEMBER 4TH 2023

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Speakers</th>
</tr>
</thead>
<tbody>
<tr>
<td>15:30</td>
<td>Opening Remarks from the ITTF Foundation President</td>
<td>Petra Sörling</td>
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<tr>
<td></td>
<td></td>
<td><em>International Table Tennis Federation and ITTF Foundation</em></td>
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<tr>
<td>15:45</td>
<td>Identifying barriers to scaling TT4Health for people with neurodegenerative diseases and beyond</td>
<td>Leandro Olvech</td>
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<td><em>ITTF Foundation</em></td>
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<td></td>
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<td>Elisabeth ‘Lizzi’ Ildal</td>
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<td><em>Cure4Parkinson</em></td>
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<td>Jens Greve</td>
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<td><em>Yuvedo Foundation</em></td>
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<td>Naseema Parak</td>
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<td><em>Parkinson ZA</em></td>
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<tr>
<td>16:10</td>
<td>Implementing TT4Health: TT4Health resilient program growth</td>
<td>Christos Balabinis</td>
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<td><em>HTTF &amp; Experimental Physiology Lab of Medical School of Athens</em></td>
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<tr>
<td></td>
<td></td>
<td>Lucie Coulon [Online]</td>
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<td><em>Fédération Française de Tennis de Table</em></td>
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<tr>
<td></td>
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<td>Trevor Brown [Online]</td>
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<td><em>Neurocare</em></td>
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<td>Koji Nagabuchi [Online]</td>
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<td><em>Japan Table Tennis Therapy Association</em></td>
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<td></td>
<td></td>
<td>Gabriel Eckhardt [Online]</td>
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<td><em>Deutscher Tischtennis Bund</em></td>
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<tr>
<td>17:20</td>
<td>Networking Coffee Break and end of Virtual Congress</td>
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<tr>
<td>17:45</td>
<td>Breakout groups: Discussion with TT players with Parkinson’s and Caregivers</td>
<td>Caregivers: Renato Walkowiak,</td>
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<td></td>
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<td><em>Ping4Alzheimers</em></td>
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<tr>
<td></td>
<td></td>
<td>Players: Elisabeth ‘Lizzi’ Ildal</td>
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<td></td>
<td><em>Cure4Parkinson</em></td>
</tr>
<tr>
<td>18:30</td>
<td>Breakout group summary</td>
<td>Rep of Caregivers and Players groups summarise their respective discussion</td>
</tr>
<tr>
<td>18:45</td>
<td>Learnings &amp; next steps: A chat with ITTF Foundation Director</td>
<td>Leandro Olvech and Khushal Palicha</td>
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<tr>
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<td><em>ITTF Foundation</em></td>
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<td>19:15</td>
<td>Closing the Congress</td>
<td>Konstantinos Papageorgio</td>
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<td><em>Hellenic Table Tennis Association</em></td>
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<td>Petra Sörling</td>
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<td></td>
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<td><em>International Table Tennis Federation and ITTF Foundation</em></td>
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THE ROLE OF FUNCTIONAL MEDICINE AND CLINICAL EXERCISE PHYSIOLOGY IN IMPROVING MITOCHONDRIAL FUNCTION IN PATIENTS WITH PARKINSON’S DISEASE

Christos P. Balabinis MSc, Ph.D.
The study was conducted under the auspices of the Experimental Physiology Lab of School of Medicine - Athens
EXERCISE PHYSIOLOGY

It is a basic and an applied science that describes, explains, and uses the body's responses to acute exercise and its adaptation to chronic training to maximize human physical potential in patients as well as athletes.
FUNCTIONAL MEDICINE

It is a systems biology–based approach, that focuses on identifying and addressing the root cause of disease.
GUT-BRAIN CONNECTION - AXIS

CNS
NEUROENDOCRINE SYSTEM
NEUROIMMUNE SYSTEM
SYMPATHETIC NERVOUS SYSTEM
PARASYMPATHETIC NERVOUS SYSTEM
ENTERIC NERVOUS SYSTEM
INTESTINAL MICROBIOTA
A large body of evidence is accumulating to support a role between healthy gut function, neural development and function of the central nervous system.

The microbiota present in the gut should be considered an inner organ with functions similar in importance to any other organ present in the body.

Disruption in this “organ” may alter many things including central nervous system function.
HOW GI TRACT INFLUENCE THE CNS

STRESS, DIETARY OR ENVIRONMENTAL TRIGGERS
NEURAL, BEHAVIORAL AND MOOD CHANGES
CHANGES IN SYNAPTIC PLASTICITY
ALTERATION IN NEUROTRANSMITTER LEVELS
BLOOD BRAIN BARRIER BREAKDOWN
INFLAMMATORY CYTOKINE PRODUCTION
IMMUNE ACTIVATION BY ENDOTOXEMIA (LPS STIMULATION)
GUT EPITHELIAL BREAKDOWN
MICROBIOTA CHANGES
RELATIONSHIP OF PARKINSON’S DISEASE WITH PESTICIDE TOXICITY, ANXIETY, STRESS AND GUT DYSFUNCTION

STOOL SAMPLE ANALYSIS REVEALED THAT BACTERIA, GENES AND BIOLOGICAL PATHWAYS DIFFERED BY MORE THAN 30% IN THOSE WITH PARKINSON’S COMPARED TO THOSE WHO WERE NEUROLOGICALLY HEALTHY.

SPECIFIC BACTERIAL SPECIES CALLED *BIFIDOBACTERIUM DENTIUM* COMMONLY KNOWN TO CAUSE INFECTIONS SUCH AS BRAIN ABSCESSES, WAS 7 TIMES HIGHER IN FOLKS WITH PARKINSON’S.

BACTERIA *ROSEBURIA INTESTINALIS* COMMONLY FOUND IN HEALTHY COLONS, WAS 7.5 TIMES LOWER IN PEOPLE WITH PARKINSON’S.
INFLAMMATION & OXIDATIVE STRESS (SEQUENCE OF EVENTS)

INFLAMMATION
INCREASE IN PRO-INFLAMMATORY CYTOKINES AND IN IMMUNE NEUROTRANSMITTERS
INCREASE IN FREE RADICALS LEADING TO OXIDATIVE STRESS
DERAILMENT OF IMPORTANT PATHWAYS (Sympathetic, HPA axis, Tryptophan, Tyrosine paths)
BIOMARKERS OF INFLAMMATION

1. CYTOKINES

2. NEUROTRANSMITTERS (Glutamate, Glycine, Histamine, Norepinephrine, Dopamine, PEA)

3. SULFITE (from Neutrophils)

4. OXIDATIVE STRESS MARKERS (DOPAC, 5-HIAA, Kynureninic acid, Quinolinic acid, Mitosox, *Mitochondrial function test*, oxLDL, Oxidized cardiolipin)
DISTINCTION BETWEEN “ACUTE” & “CHRONIC” INFLAMMATION

CHRONIC, NOT ACUTE INFLAMMATION, IS THE REAL KILLER

CLINICAL MANIFESTATIONS, IN MOST CASES, ARE THE NET RESULTS OF YEARS AND YEARS OF CHRONIC OR LOW-GRADE INFLAMMATION
WHETHER OR NOT INFLAMMATION GENERATES EXCESSIVE OXIDATIVE STRESS DEPENDS ON:

A. DURATION OF INFLAMMATION

B. ANTIOXIDANT CAPACITY

*** Not everyone will develop excessive oxidative stress ***
DIFFERENCES BETWEEN NERVOUS & IMMUNE SYSTEM AFTER INFLAMMATORY EVENTS

IMMUNE SYSTEM RECOVERS QUICKLY

NERVOUS SYSTEM DOES NOT RECOVER FOR THE MOST PART.

CHRONIC IMMUNE ISSUES HAVE NEGATIVE EFFECT ON THE NERVOUS SYSTEM; NOT SELF-REPAIRING
MITOCHONDRIA. THE POWERHOUSES OF THE CELL

SUPPLY ATP AS A SOURCE OF CHEMICAL ENERGY

INVOLVED IN CELLULAR SIGNALING

HELP IN CELL DIFFERENTIATION

PLAY A KEY ROLE IN CELL DEATH
MITOCHONDRIA ARE ALSO INVOLVED IN REGULATING BODY SYSTEMS

NEUROTRANSMITTER REGULATION
(Norepinephrine, Dopamine and Serotonin)

HORMONE BIOSYNTHESIS
Mitochondria Regulate Neurotransmitters

- Tyrosine
- Dopamine
- Tryptophan
- Serotonin
- NO
- Free radicals
- ONOO⁻
- ROS/RNS
- *OH
- H₂O₂
- Kynurenine
- KMO
- KAT
- Kynurenic Acid
- Quinolonic Acid
MITOCHONDRIA GIVE BIRTH TO ALL HORMONES

PREGNENOLONE
PROGESTERONE
CORTIZOL
DHEA
TESTOSTERONE
ESTRADIOL
ESTRONE
ESTRIOL
WHAT OCCURS WHEN MITOCHONDRIA ARE STRESSED?

1. MILD TO MODERATE DISFUNCTION

2. MITOCHONDRIAL TOXICITY

3. MITOCHONDRIAL LOSS

4. APOPTOSIS
DISEASES LINKED TO MITOCHONDRIAL DYSFUNCTION

1. NEURODEGENERATIVE DISEASES
2. IMMUNE DISEASES
3. HEPATIC DISEASES
### DESCRIPTIVE STATISTICS FOR 4 MEN AND 4 WOMEN MATCHED BY AGE, HEIGHT, WEIGHT, PERCENTAGE OF BODY FAT AND ACTIVITY LEVEL QUESTIONNAIRE

#### PRE – TREATMENT

<table>
<thead>
<tr>
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<th>MEN</th>
<th>WOMEN</th>
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<tbody>
<tr>
<td>AGE (years)</td>
<td>58.6 (2.51)</td>
<td>59.3 (2.88)</td>
</tr>
<tr>
<td>HEIGHT (cm)</td>
<td>176 (2.51)</td>
<td>163.8 (2.49)</td>
</tr>
<tr>
<td>WEIGHT (kg)</td>
<td>85.2 (2.36)</td>
<td>70.7 (2.21)</td>
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<tr>
<td>% BF</td>
<td>36.1 (2.17)</td>
<td>42.2 (2.22)</td>
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<td>N OF SUBJECTS</td>
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<td>QUESTION 1</td>
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<td>QUESTION 2</td>
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#### POST TREATMENT

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<tr>
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<tr>
<td>WEIGHT (kg)</td>
<td>79.8 (2.25)</td>
<td>68.8 (2.19)</td>
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<tr>
<td>% BF</td>
<td>34.7 (2.26)</td>
<td>40.9 (2.33)</td>
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<tr>
<td>N OF SUBJECTS</td>
<td>4</td>
<td>4</td>
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</tbody>
</table>
MITOCHONDRIAL NUTRITIONAL SUPPORT

ACETYL – L – CARNITINE (1,000 mg/day)
N – ACETYL – CYSTEINE (1,200 mg/day)
ALPHA LIPOIC ACID (400 mg/day)
COENZYME Q – 10 (100 mg/day)
GANODERMA LUCIDUM (4000 mg/day)
MUCUNA PRURIENS (500 mg/day for women AND 600 mg/day for men)
MULTIVITAMIN (2 tablets per day)
TRAINING PROGRAM

PILATES (once per week)

AIR BIKE PROGRAM (once per week)
*During the first 12 weeks, 12 minutes easy pace and 12 minutes moderate pace. During the second 12 weeks 12 minutes easy pace, 1 minute moderate to hard pace, 5 minutes moderate pace and 6 minutes easy pace*

WEIGHT TRAINING (once per week)
*3 sets * 8 reps at 60% - 65% - 70% of 1 RM. Stand ups from sitting position, Bicep curls, Shoulder press, Leg press (4 leg positions), Leg extension (3 leg directions)*
THANK YOU

Christos P. Balabinis MSc, Ph.D.
cbalab@freemail.gr
TABLE TENNIS WITH DEMENTIA
German Federal Ministry

DOSB

3 Organisations
OUR CONCEPT

- Six clubs
- 2x 10 Training Sessions per club
- Experienced Trainers
- Slower game through different balls
GETTING MEMBERS

1. Start in a Sports Hall or in a home for the elderly

2. Training group in a sports hall
# TRAINING SESSION

<table>
<thead>
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<th>Content</th>
<th>Duration</th>
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<tr>
<td>1 Welcome Time</td>
<td>10 min</td>
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<tr>
<td>2 Ritual</td>
<td>10 min</td>
</tr>
<tr>
<td>3 Coordination &amp; Dual Task</td>
<td>15 min</td>
</tr>
<tr>
<td>4 Balance Exercises</td>
<td>10 min</td>
</tr>
<tr>
<td>5 Endurance Training</td>
<td>15 min</td>
</tr>
<tr>
<td>7 Strength Training</td>
<td>15 min</td>
</tr>
<tr>
<td>8 Relaxation</td>
<td>15 min</td>
</tr>
</tbody>
</table>

90 min

Matches, Doubles or Games
1 WELCOME TIME
2 RITUAL
3
COORDINATION & DUAL TASK
4 BALANCE EXERCISES
5 ENDURANCE TRAINING
6 STRENGTH TRAINING
7 RELAXATION
PROJECT FINDINGS

Getting Members

• Networking to contact points are necessary
• Face-to-face contact is important to win participants

Trainer

• Empathy and specific knowledge about the disease are a must have
• It’s very useful to have experience in table tennis for health

Training sessions

• You can play table tennis with the target group
  ➢ Slowing the game with different balls
• Endurance training with mobil people is possible
TO DO IN THE FUTURE

- Getting more clubs involved
- Enhance our documents
- Qualify trainers
CONTACT DTTB

Gabriel Eckhardt
eckhardt.dttb@tischtennis.de

VIELEN Dank!
Thank you!
Benefits of table tennis for preventing dementia in the elderly

Takao Yamasaki

1) Department of Neurology, Minkodo Minohara Hospital, Fukuoka, Japan
2) Kumagai Institute of Health Policy, Fukuoka, Japan
3) School of Health Sciences at Fukuoka, International University of Health and Welfare, Fukuoka, Japan
Introduction

- With aging, the global prevalence of dementia has increased exponentially. Dementia negatively impacts the physical, psychological, social, and economic status of patients and places a heavy burden on caregivers, families, and society. Therefore, dementia-associated care is one of the biggest challenges worldwide.

- Dementia can be caused by various diseases, with Alzheimer’s disease (AD) being the most common, accounting for 60–80% of all dementia cases. Moreover, mild cognitive impairment (MCI) is known as the prodromal stage of AD.

- Unfortunately, there are currently no fully effective disease-modifying treatments for dementia.

Immediate efforts with nonpharmaceutical interventions are needed to prevent the development of MCI and progression of MCI to dementia.
Currently, **twelve modifiable risk factors** for dementia have been identified.

- Less education
- Hearing loss
- Traumatic brain injury
- Hypertension
- Alcohol
- Obesity
- Smoking
- Depression
- Social isolation
- **Physical inactivity**
- Air pollution
- Diabetes

Modifying these risk factors may **prevent or delay up to 40% of dementia cases**.

(Livingstone, et al., Lancet 2020)
The World Health Organization (WHO) guidelines

- The WHO guidelines provide evidence-based recommendations on lifestyle behaviors and interventions to delay or prevent cognitive decline and dementia.

- Physical activity interventions
  - Tobacco cessation interventions
  - Nutritional interventions
  - Interventions for alcohol use disorders
  - Cognitive interventions
  - Social activity
  - Weight management
  - Management of hypertension
  - Management of diabetes mellitus
  - Management of dyslipidemia
  - Management of depression
  - Management of hearing loss

Adults aged 65 years and above should do at least 150 minutes of moderate-intensity aerobic physical activity throughout the week, or do at least 75 minutes of vigorous-intensity aerobic physical activity throughout the week, or an equivalent combination of moderate and vigorous-intensity activity. Aerobic activity should be performed in bouts of at least 10 minutes’ duration.

(WHO, 2019)
Benefits of aerobic open-skill exercise (OSE) on cognitive function

- Sports can be classified into **open-skill exercise (OSE)** and closed-skill exercise (CSE).

- **OSE** is performed in dynamic, externally paced, and more unpredictable environments (e.g., table tennis, tennis, badminton, etc.).

- CSE is performed in relatively consistent, self-adjustable, and more predictable environments (e.g., running, cycling, etc.)

- **OSE** can lead to **greater improvements in cognitive function** (e.g., executive functions) in healthy older adults than CSE.

Table tennis may be effective in preventing cognitive decline and dementia because this sport involves moderate-intensity aerobic OSE.

(Yamasaki, Brain Sciences 2023)
Effects of table tennis on the brain: Neuroscientific evidence

- Table tennis requires both large and fine motor control and sensory integration, leading to the activation and improved function of multiple neural regions and networks.

  Brain regions related to motor control, attentional processing, decision-making, and executive function

- Long-term play can modify brain activity patterns even during other tasks, suggesting improved general neurological function.

  Brain regions related to early sensory information (e.g., visual motion) processing, information integration, information matching identification, response selection, attentional control, visuomotor processing, processing speed, movement planning, and execution under high attentional demands

(Yamasaki, Encyclopedia 2022)
Playing regular table tennis causes various changes in the brain.
- Improvements in cardiovascular risk factors
- Increased expression of neurotrophic factors
- Enhanced amyloid-β turnover
- Increased cerebral blood flow
- Reduced inflammatory responses

These in turn induce neuroplastic alterations in various brain networks.
- Motor-related areas
- Visual cortex (particularly visual motion area)
- Frontal regions

These ultimately lead to improved sensorimotor and executive functions.

Consequently, table tennis may maintain or improve cognitive functions and prevent dementia.

(Yamasaki, Encyclopedia 2022)
Table tennis intervention could be a powerful strategy to prevent cognitive decline and dementia in the elderly.

References


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yamasaki_dr@apost.plala.or.jp; takaoya0317@gmail.com