



The therapeutic use of table tennis

An Evidence-Based Guide
by Sport for Confidence



This edition published in 2021 by Sport for Confidence.

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Review date: July 2026.

This guide should be referenced as:

Pettican A, Bullen D, Barrett L, Fletcher L (2021) The therapeutic use of table tennis: an evidence-based guide. London, UK: Sport for Confidence.

INTRODUCTION

Table tennis, also sometimes known as ping-pong, is a sport conventionally played by two or four players. It involves hitting a ping pong ball across a table using small, solid rackets. It began as a Victorian aristocratic parlour game and is now played in more than 200 countries worldwide.

Disabled people and people living with long-term conditions, such as a mental health problem, have been identified as being much less likely to be engaged in sport and physical activity than the general population (1). Because of this they do not at present fully benefit from the many outcomes that such participation has been shown to bring about, namely benefits to physical health, mental wellbeing and the enhancement of social bonds. This inequality has led to a growing interest in how sport and physical activity might be utilised for therapeutic means and ends (2). The intention of this guide is to support and inform such work, and it has been produced by occupational therapists at Sport for Confidence in collaboration with Table Tennis England and Brighton Table Tennis Club.

Central to the practice of occupational therapy is a concern for the relationship between activity participation and health and wellbeing. Occupational therapy practice involves utilising a range of activities for assessment and intervention, often through grading, adapting, and modifying the activity to ultimately enable meaningful participation for those who wish to take part. It is therefore considered a priority that occupational therapists, and anyone else involved in using sport and physical activity for therapeutic means and ends, consider sporting activities for their therapeutic potential and also for their role in enabling people with a range of health conditions to live a more active lifestyle (3).

This guide is intended to be a starting point for thinking about and planning how to use table tennis for therapeutic means and ends, and includes an assortment of ideas, suggestions and resources. We would particularly like to emphasise that we are not advocating for table tennis to necessarily be utilised in accordance with convention and its rules, as enabling meaningful engagement and therapeutic outcomes may well involve some adaptation and modification of both the game and the playing environment. For example, initially playing table tennis with an individual in their own home to establish interest and understanding, before introducing them to a group or table tennis club context. Additionally, we would also like to emphasise that practice must always be client-centred in terms of activity preferences, interests, and values.



What is table tennis?

Table tennis is a sport played by two or four players, and involves hitting a ping pong ball across a table using small, solid rackets.

The set-up and rules of the game are similar to tennis, but the smaller scale and reduced movement make it more accessible to people of all ages and abilities. Just like tennis, it can be played solo or in pairs.

You score a point by making a shot your opponent fails to return, or when your opponent's return doesn't hit your side of the table.

The first player or pair to reach 11 points wins the game. If both players reach 10 points, the winner is the first to gain a lead of two points. Whoever wins the most of an odd number of games is the overall match winner. However, of course you can also just play table tennis for fun, and many enjoy working as a team with a partner to keep the longest rally possible.

Polybat is a more accessible alternative to table tennis that is also a bat and ball game played on a table tennis table, but with the net removed and with side barriers added.

How do I get started?

Following the coronavirus pandemic, there has never been a more important time to have conversations about the importance of being active and the impact it has on our health and wellbeing. A strength of table tennis is its adaptability – it can be played at home on a kitchen table if shielding, as well as outdoors in socially distanced small groups if required.

It is impossible to cover here every scenario you might encounter when approaching someone to potentially participate in table tennis, but we hope the tips below might provide some useful guidance in most situations:

- Carefully plan and agree any new physical activity, to ensure it is realistic, motivates people, and provides a sense of achievement.
- Ask people about how they normally spend their time – get them to tell you about a typical day and make sure you keep focused on what is important and enjoyable for that person.
- Find out about what people do (and don't!) like to do.
- Remember that simply doing more physical activity isn't always what is healthy – at times some people may have too much to do – a good balance is what is important.
- Set achievable and meaningful goals, be realistic and acknowledge there may be steps back, as well as forwards. People's circumstances and mind-set can change over time.
- Talk about and acknowledge barriers – someone might need help to go out, or have limited space and resources to be active.
- Remember to explore both physical and mental health in relation to people being active – not just what they physically can or can't do, but how they feel.
- Celebrate ALL achievements, however small they seem – small steps over time gradually become big leaps!



What equipment will I need?

A ball, the rackets or paddles, the table, and the net. However, it should be emphasised that it is not necessary to have access to specialist equipment, and that a make-shift table can be fashioned from a kitchen or dining table, and if adapting for polybat or similar, the side panels can be made from cardboard.



How is table tennis played?

- Conventionally table tennis is played from a standing position with opponents at opposite ends of the table, but it can also be played from a seated position.
- The aim of the game is to hit the ball over the net to your opponent's side of the table.
- A point is scored when your opponent is unable to return the ball to your side of the table (for example, they miss the ball, they hit the ball but it misses your side of the table, or the ball hits the net) or if they hit the ball before it bounces on their side of the table.
- The winner of the game is the first to 11 points, although there must be at least two points between opponents at the end of the game, so even if the score is 10-10, the game should go into extra play until one of the players has gained a lead of two points.
- The point goes to the player who successfully ends a rally, regardless of who has served.
- A match can consist of whatever number of games you like.
- However, we would encourage creative adaptations to promote inclusion and accessibility. This might include playing with a larger sponge ball or balloon, playing from a seated position and/or using side panels.



How might I use table tennis therapeutically?

Table tennis can be utilised in a multitude of ways and with a range of client populations. As a paired and interactive sport there is an obvious application to a therapeutic group setting, but there is also the potential to use it as part of an individual intervention. For example, there are many different roles involved in a game of table tennis, with a range of tasks and activities arising from each game. So someone could participate by setting up the table and equipment, keeping score and being a coach to others. To provide ideas and inspiration for the therapeutic use of table tennis or polybat, an activity analysis and five case studies have been included on the following pages.

ACTIVITY ANALYSIS

An activity analysis involves determining the typical demands of an activity, the range of skills involved in its performance, and the meanings that might be associated with it.

The activity analysis below of playing table tennis is provided as a starting point to prompt reasoning and thinking. It is not therefore exhaustive in terms of the many forms and environments in which participation in table tennis could potentially be enabled. The activity analysis has been informed by both the International Classification of Functioning, Disability and Health (4) and the Occupational Therapy Practice Framework (5).

Cognitive

- Conscious and orientated, with the energy and drive to participate and react.
- Concentration on game and related activities (for example, chatting to opponent or teammate).
- Engages in purposeful rallies.
- Retains information about rules of the game and scores.
- Emotional response to winning or losing, potential sense of achievement.
- Success and development of self-esteem.

Sensory

- Form, size, shape and colour of ball determined through sensory information.
- Vestibular functions and balance to enable positioning, manipulation and striking of ball.
- Sensory demands of the game and playing environment will need to be considered and adapted carefully to enable meaningful participation. For example, a large sports hall may provide too much sensory stimulation for some players.

Speech

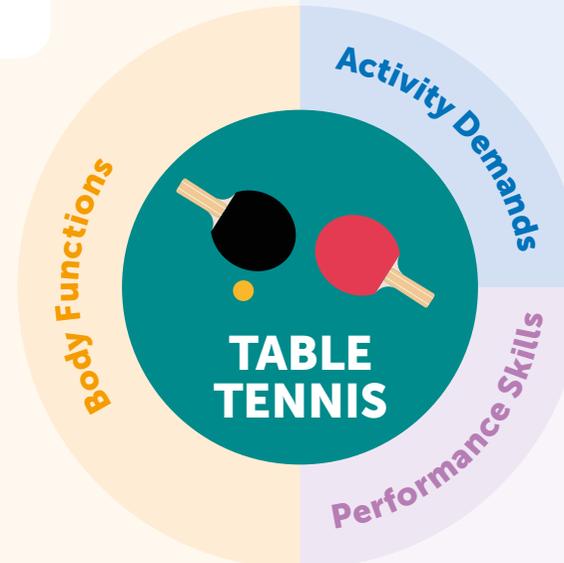
- No specific voice and speech demands, though playing the game provides opportunities for verbal interaction with opponent or teammate in relation to rules, turn-taking and scoring.
- Player may wish to ask for assistance at times (for example, picking up the table tennis ball), but can adapt communication to gesturing and/or writing if required.

Neuro-musculoskeletal

- Conventionally a standing game requiring postural control or support, though can be adapted to seated.
- Joint, muscle and movement functions to enable grip of bat, swing of arm and forward/back/side-step movements.
- Development of hand-eye coordination and reaction time through ball tracking and participation.
- Bi-lateral integration and crossing of the mid-line when reaching across the table, striking the ball and through general play.

Cardiovascular

- Sufficient blood pressure to enable movement and postural control.
- Respiration functions to enable participation, though may require modification in specific incidences (for example pacing of play for a player with a respiratory condition).
- Consideration will need to be given to physical endurance, aerobic capacity, stamina and fatigability, with play being adapted accordingly.



Relevance & Meaning

Playing table tennis or Polybat offers the opportunity to participate in an individual or team sport (doubles) and therefore a form of physical activity, to maintain or enhance health, well-being and/or independence.

Equipment & Resources

- Table tennis table (or table top)
- Net
- Table tennis balls
- Table tennis bats
- Cones, bottles, cups – having a range of equipment will enable different ways of participating
- Chair (if playing seated)
- Side panels and clips if adapting to Polybat
- Polybat paddles
- Polybat air flow ball

Space

- A clear, well-lit open space is needed to ensure enough space around the table tennis table.
- Table tennis can also be played outdoors and there are many tables situated in public parks and spaces.

Social

Playing table tennis as a sport involves rules in relation to turn-taking and scoring. It is acknowledged that these might initially be areas of development for which the activity is used (for example, to develop social skills in relation to an awareness of others through turn-taking especially when playing doubles).

Sequencing

Playing table tennis involves various steps, again depending on stage of participation: taking a standing position at the table (or seated if adapted to Polybat), serving if it's your turn, receiving the ball, returning the ball, scoring, collecting the ball, returning to your position. Turn-taking if playing doubles.

Motor:

- Positions self in ambulant position at the table.
- Grips the table tennis bat in hand and coordinates to strike the ball either with forehand or backhand.
- Ambulant movement to reach for ball and perform defensive and offensive reaction shots.
- Plays coordinated strokes with controlled pace and direction.
- Fine and gross motor skills can be developed by handling bat and practicing striking the ball at targets or against a wall, e.g. grip strength, balance and endurance.
- May be adapted to Polybat by adding side panels to adapt width of table and taking a seated position.

Social Interaction:

- Approaches or initiates interaction with opponent / team-mate, may involve speech and/ or gestures.
- Places self at appropriate distance from other teammate during a doubles game.
- Takes their turn and gives teammate the freedom and space to take theirs.
- Social interaction skills can be developed through playing table tennis, for example the regulation of emotion through winning or losing.

Process:

- Initiates steps associated with playing table tennis and completes in a logical manner.
- Adjusts performance to try different methods of positioning and/or returning the ball in order to participate.
- Process skills can be developed as participation in table tennis progresses, for example through taking on a leadership role in terms of turn-taking and/or scoring.

CASE STUDIES

To provide ideas and inspiration, five case-studies are provided below. The intention of the case-studies is to highlight the potential diversity of table tennis and polybat, although it is also emphasised that practice should be client-centred and any chosen activities must be selected and planned in collaboration with the service user.

Please note that names and other identifying information in the case studies below has been changed to protect confidentiality.



Elaine

Elaine is a 64-year-old woman with a diagnosis of Parkinson's disease. Elaine was already an experienced table tennis player when she joined Brighton Table Tennis Club (BTTC), but she was finding other sports too difficult to play and so decided to focus on the benefits of playing table tennis.

Within months of joining the club she went from playing one day a week to almost every day. Elaine experiences a range of physical and mental health benefits from playing table tennis, and described it as the best sport for her brain!

Playing table tennis has helped with her coordination and balance. Elaine comments that when she is at home she cannot stand for too long, but when she plays table tennis she can stand for 2-3 hours playing. Her left side is particularly affected and when she is sitting down and then gets up to start to walk, she feels very clumsy and rigid, but after playing table tennis she can walk very well and feels less rigid.

Elaine is now involved with Parkinson's UK, supporting the coordination of the Parkinson's disease world table tennis championships. Elaine regularly now volunteers at the club coaching and organising outdoor table sessions and thus encourages others to experience the benefits of playing.

John

John is a 39-year-old man with diagnoses of a learning disability and autism. He is also blind in one eye. John became involved in playing Table Tennis at BTTC through the Grace Eyre Foundation, a charity supporting adults with learning disabilities, and started to attend a Friday evening group session.

At first John found it very difficult to track the ball and could not hit or connect with the bat and ball, but with one-to-one support and adaptations, John then made great progress. For example, he progressed from using a larger bright coloured ball that he rolled across the table with hands, to then pushing the ball with a bat under a raised net. John then gradually moved on to playing a rally over the net with a larger ball to develop backhand and forehand strokes, eventually being able to rally over 100 shots with a regulation size ball.

John states how much confidence this has given him and his improved hand and eye coordination achieved through utilising table tennis as an intervention has crossed over into giving him more independence with other everyday tasks. John even attended a residential table tennis camp in the Midlands with support, an amazing life experience for him.

Hilary

Hilary lives in a care home. She is registered as partially sighted and is nearly blind, but that doesn't stop her enjoying a game of ping pong, as she can recognise the bright orange colour of the table tennis balls when playing.

By using pop-up nets and brightly coloured larger balls, the likelihood of hitting the ball increases, and Hilary is able to play and laugh alongside sighted people. Hilary's family are amazed that she plays table tennis; even though her vision is extremely limited. She's able to apply other sensations and senses she wouldn't have had to use when she was younger.

Interacting with others through playing table tennis while seated, has not only helped to keep her body active, but also kept her brain active. As Hilary's daughter says, with adapted table tennis equipment everyone in the care home is engaged – whether actively joining in or watching the fun!

A school-based table tennis group

Table tennis was used as an integration project, for Year Seven pupils finding it difficult to work in a group. The group took place in a local mainstream secondary school, with a group of Year Seven children with various additional needs, including attention deficit hyperactivity disorder (ADHD), autism, sensory processing disorder and some with physical disabilities.

Table tennis was utilized with the main aim of developing social skills and facilitating a sense of belonging in their new school and as part of a group. Therefore the emphasis was placed on table tennis as an opportunity to get along with others and lots of paired tasks, playing with different partners.

In addition to this, team games and challenges were used to assist the need for players to work together and develop their social skills. Warm up games were used to promote interaction of the young people and healthy competitive challenges and games to help them to learn to regulate their emotional response to winning and losing. Table tennis practices and skills were differentiated for the individual needs and numeracy skills were also encouraged through teaching scoring games and counting rallies and challenges.



Further case studies and more information on impact through table tennis, including disability and long-term health conditions, can be found at:
www.tabletennisengland-impact.co.uk

Online table top table tennis

A key component of the occupational therapy role at sport for confidence CIC involves working alongside a sports coach. During lockdown it was important to explore different ways to engage with people, finding ways to stay active, build rapport and connect with others. Online table tennis proved to be a great way to achieve all of these outcomes providing just the right challenge to the participants.

The game was adapted to overcome online challenges by encouraging participants to get creative using string and cardboard designing their own nets and side panels (similar to polybat) using tables at their own home. The creative design proved to be a fun aspect to the session. This was a particularly engaging activity for participants living in group settings or individuals living with family members, as it offered the opportunity for participation and interaction.

The sports coach encouraged individual and group participation and the occupational therapist was able to engage with the participants before, during and after the session, working on individual goals to support any broader occupational or quality of life goals. The online delivery also enabled people to play table tennis games and drills against each other on their devices. This included challenges such as who can keep the ball bouncing on the bat the longest, and who can perform the best trick. Whilst playing in isolation at home, this enabled people to still play together, remaining in contact with others, making new friends and learning new skills.



WHAT IS THE EVIDENCE-BASE?

There is a lack of research concerned with the therapeutic use of table tennis, but there is some evidence of its therapeutic value.

In particular, recent research has suggested that table tennis has value as a therapeutic intervention that promotes motor skills, executive functions (a set of mental skills that include working memory, flexible thinking, and self-control) and social behaviour in children with cognitive/perceptual problems and learning disabilities (6,7).

Furthermore, research has indicated that movement patterns when playing real table tennis are different to when playing table tennis via an active virtual games console. This should therefore be considered when using table tennis to promote gross motor skill development (8).

A table tennis intervention has also been found to promote workplace health and wellbeing amongst warehouse workers (9). Please see our evidence table below for further details.

PUBLICATION & COUNTRY OF ORIGIN	AIMS OF STUDY	PARTICIPANTS	DESIGN (DATA COLLECTION & ANALYSIS)	KEY FINDINGS
Bufton et al (2014)	To compare movement patterns of nineteen 10-12 year old children, while playing table tennis on three active virtual games (Nintendo Wii, Xbox Kinect, Sony Move).	Nineteen 10-12 year olds, playing table tennis on three active virtual game consoles (Nintendo Wii, Xbox Kinect, Sony Move) and as a real world task.	Wrist and elbow joint angles and hand path distance and speed were captured for each of the participants in relation to the four different forms of table tennis.	Children playing real table tennis had significantly smaller and slower movements than when using all three active virtual game consoles. Hand path distance was smaller in forehand and backhand strokes during playing with Kinect than Move and Wii. The movement patterns when playing real and virtual table tennis were different and this may impede the development of real world gross motor skills.
Chen et al (2015) Taiwan	To investigate the effects of table tennis training (TTT) versus standard occupational therapy (SOT) on visual perception and executive functions in school-age children with mild intellectual disabilities and borderline intellectual functioning.	Children (n=91) randomly assigned to either TTT or SOT, plus a control group. Both TTT and SOT programs were administered 60 minutes per session, three times a week, for 16 weeks.	Randomised controlled trial. The Test of Visual Perceptual Skill – third edition (TVPS-3) was used to evaluate visual perception, and executive functions were assessed by the Wisconsin Car Sorting Test 64-card version (WCST-64) and the Stroop test.	Table tennis should be considered a therapy option while treating cognitive/perceptual problems in children with mild intellectual disabilities and borderline intellectual functioning.
Hertting et al (2020) Sweden	To explore a sport-based intervention (table tennis – with a focus on physical activity, social relations and learning) to promote health and well-being in the workplace.	Thirteen employees from the warehouse of a company within the retail sector.	One initial workshop, a sport-based intervention, three group interviews, and a final workshop. A hermeneutic phenomenological analysis focused on experiences of the intervention.	Three themes: (1) Expressing positive individual effects (2) Expressing improved work environment, and (3) the meaning of the workplace as lived space.
Pan et al (2016) Taiwan	To investigate the effects of a 12 week table tennis exercise on motor skills, social behaviours, and exercise functions in children with attention deficit hyperactivity disorder (ADHD).	Thirty-two boys with ADHD, aged 6-12 years. In the first 12 week phase, 16 children (group 1) received the intervention, whereas 16 children (group 2) did not. A second 12 week phase immediately followed with the treatments reversed.	Randomised controlled trial. The long form of the Bruininks-Oseretsky Test of Motor Proficiency, Second Edition (BOT-2). The Chinese version of the Child Behavior Checklist for the participants was completed by their parents for evaluating the behavioral problems and social competences of the participants. The children’s version of the Stroop Color and Word Test for ages 5–14 years was used for evaluating executive functions.	The racket sport intervention is valuable in promoting motor skills, social behaviours and executive functions and should be included in standard care of children with ADHD.

Table: Table tennis for therapeutic means and ends: Summary of informing literature

FURTHER INFORMATION

www.tabletennisengland.co.uk/clubs/being-inclusive/

<https://coacheducation.tabletennisengland.co.uk>

www.brightontabletennisclub.com

www.sportforconfidence.com

www.rcot.co.uk

www.activityalliance.org.uk



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