

Identifying the right intervention for your child

A guide to cerebral palsy interventions for children

Implementing the right interventions for your child's development is vital to ensuring they achieve the best possible outcomes.

But with hundreds of different types of interventions available, how can you identify which ones you should do, and which ones you shouldn't?

Using research to identify what works and what doesn't

New research from Cerebral Palsy Alliance Research Institute offers the most comprehensive summary available of interventions that work and those that don't, for children with cerebral palsy.

A team led by Professor Iona Novak, Head of Research, Cerebral Palsy Alliance Research Institute and the University of Sydney, has updated an earlier paper published in 2013, gathering and analysing all systematic reviews newly available between 2013 and 2019.

The researchers searched for and found 1584 articles that could have been relevant, then reviewed them and removed those that were not relevant to children with cerebral palsy, leaving 247.

In those articles were 182 different interventions for cerebral palsy – 41 to prevent and 141 to manage. And among those interventions were 398 different outcomes that had been measured – things like quality of life, gross motor skills or sleep.

The interventions were then ranked using the Evidence Alert Traffic Light Grading System, developed by Cerebral Palsy Alliance in 2012 to help parents, clients and clinicians understand evidence.

What is a systematic review?

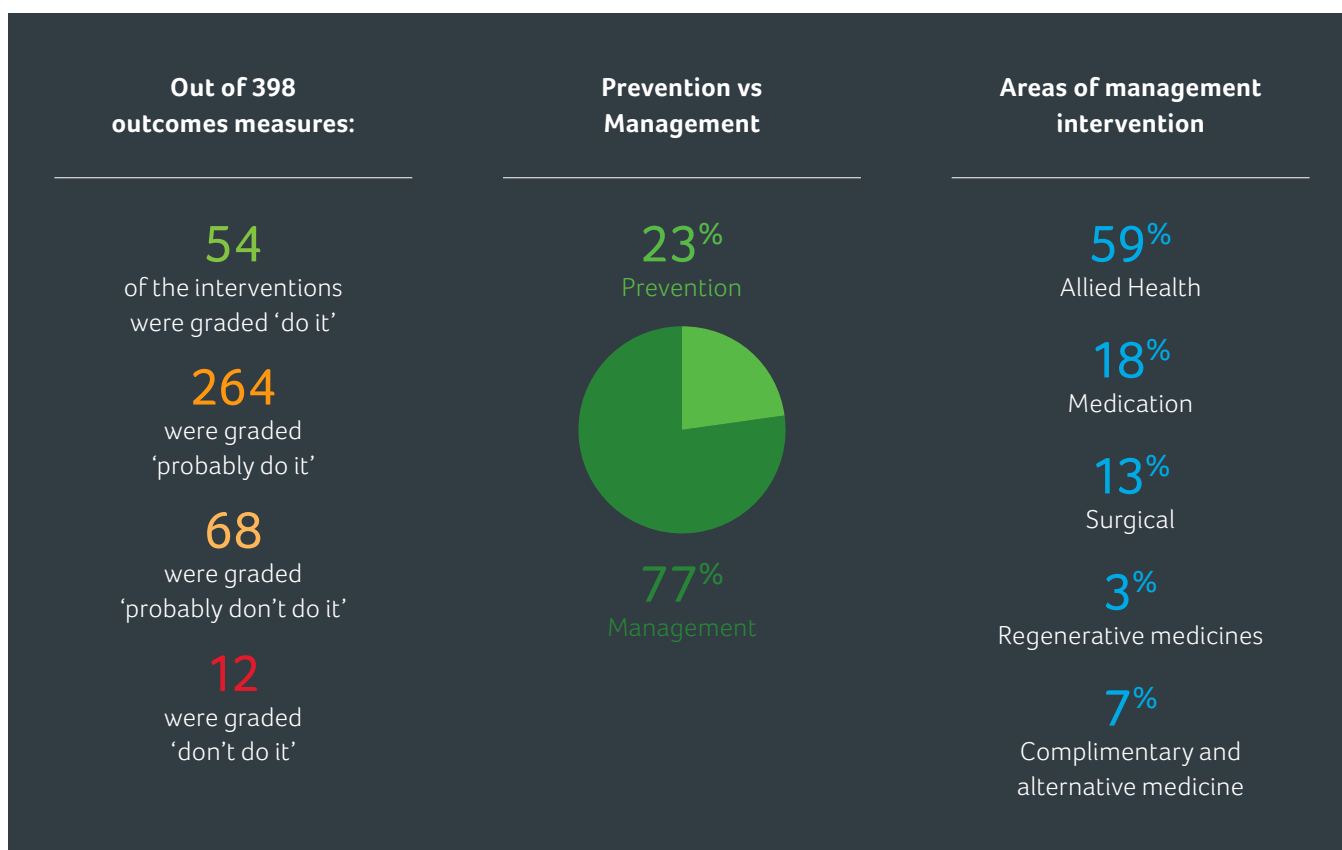
This type of review uses systematic methods to collect published data, critically appraise research studies, and synthesize findings. It is seen as the highest possible standard of evidence.

Why are there more outcomes than interventions?

The number of intervention outcomes is higher because some interventions may have more than one outcome. For example, botox is an intervention, however research indicates it can achieve two different outcomes – one is to reduce spasticity, while another is to improve function. This is why there are more intervention outcomes, than actual interventions.

The Evidence Alert Traffic Light Grading System

Colours of light	Evidence	Meaning
● Green light	High-quality evidence indicates intervention effectiveness	Do it
● Strong yellow light	Promising evidence suggests possible effectiveness	Probably do it
● Weak yellow light	No research exists, or conflicting findings exist	Probably don't do it
● Red light	High-quality evidence indicates ineffectiveness or harm	Don't do it



Why is the traffic light system helpful?

The traffic light system provides a wonderful guide that allows busy parents, carers and clinicians to start conversations about what to do and what not to do. It empowers them to make informed and evidence-based decisions.

It also provides reassurance that there is plenty of good evidence about what to do and what not to do in efforts to improve the lives of children with cerebral palsy and their families and carers.

How to use the table

To use the table, find the type of improvement you want to make (eg. muscles and movement, pain, or self-care). Then look for the specific improvement you'd like to make within that table (eg. improve hand function, or reduce pain).

It is important to note that where an intervention is graded 'do it' or 'probably do it', the evidence has indicated that an intervention will work for most children, but maybe not for all children. As a parent or carer, you will need to discuss options with your clinicians and advisers, based on your child's particular circumstances.

Interventions that have been graded with a green light or a strong yellow light are listed below.

Muscles and movement



IF YOU WANT TO...	THERAPIES THAT CAN HELP
Improve hand function	<ul style="list-style-type: none"> ● Constraint-induced movement therapy; action observation training; bimanual training; goal-directed training; environmental enrichment; home programs using goal-directed training ● Assistive technology robotics; assistive technology virtual reality + gaming; biofeedback; botulinum toxin with physiotherapy; bone marrow MNCs; Botulinum toxin with electrical stimulation; Botulinum toxin with orthotic; hippotherapy; hand-arm bimanual intensive training including lower extremity; hippotherapy simulation; levodopa; mesenchymal hand function; orthotics night hand splint; seating; trihexyphenidyl; taping; transcranial direct current stimulation; constraint-induced movement therapy <2yrs; constraint-induced movement therapy or bimanual
Improve gross motor skills	<ul style="list-style-type: none"> ● Goal-directed training; environmental enrichment; treadmill training; task-specific training; umbilical cord blood ● Ankle foot orthoses; acupuncture; animal assisted therapy; bone marrow MNCs; deep brain stimulation; casting; coaching; herbal medicine; hippotherapy; hydrotherapy; focal vibration; fitness training; hand-arm bimanual intensive training including lower extremity; hippotherapy simulation; intrathecal baclofen; mobility training; modified sport; mesenchymal hand function; neural stem cells; partial body weight support treadmill training; strength training; single event multi-level surgery; taping; selective dorsal rhizotomy; whole body vibration; motor training; goals-activity-motor enrichment; general stimulation; COPCA – Coping with and caring for infants with special needs – a family centered program
Improve goal achievement	<ul style="list-style-type: none"> ● Botulinum toxin with occupational therapy
Improve activity and participation	<ul style="list-style-type: none"> ● Constraint-induced movement therapy ● Physical activity
Improve balance	<ul style="list-style-type: none"> ● Hippotherapy ● Assistive technology virtual reality with biofeedback; assistive technology Wii fit; transcranial direct current stimulation
Improve symmetry	<ul style="list-style-type: none"> ● Hippotherapy
Improve walking speed	<ul style="list-style-type: none"> ● Partial body weight support treadmill training; mobility training ● Ankle foot orthoses; botulinum toxin with electrical stimulation; fitness training; single event multi-level surgery
Improve walking endurance	<ul style="list-style-type: none"> ● Treadmill training ● Partial body weight support treadmill training
Improve muscle strength	<ul style="list-style-type: none"> ● Strength training ● Botulinum toxin with resistance; electrical stimulation; yoga
Improve stride length	<ul style="list-style-type: none"> ● Ankle foot orthoses
Improve kinematics	<ul style="list-style-type: none"> ● Ankle foot orthoses
Improve mobility	<ul style="list-style-type: none"> ● Assistive technology adaptive equipment; transcranial direct current stimulation

Improve walking	<ul style="list-style-type: none"> ● Assistive technology virtual reality with gaming; biofeedback; botulinum toxin with physiotherapy; casting; intrathecal baclofen; physical activity; single event multi-level surgery; transcranial direct current stimulation
Improve activity	<ul style="list-style-type: none"> ● CO-OP – Cognitive orientation to occupational performance
Improve performance	<ul style="list-style-type: none"> ● CO-OP – Cognitive orientation to occupational performance
Improve function	<ul style="list-style-type: none"> ● Context focused therapy; gabapentin; selective dorsal rhizotomy; COPCA – Coping with and caring for infants with special needs – a family centered program
Improve gait parameters	<ul style="list-style-type: none"> ● Electrical stimulation
Improve walking for GMFCS IV-V	<ul style="list-style-type: none"> ● Mobility training; modified sport
Improve motor function	<ul style="list-style-type: none"> ● Mirror therapy
Improve physical activity	<ul style="list-style-type: none"> ● Physical activity
Improve fitness	<ul style="list-style-type: none"> ● Physical activity
Improve speech intelligibility	<ul style="list-style-type: none"> ● Motor speech
Improve upper limb strength	<ul style="list-style-type: none"> ● Strength training
Improve participation	<ul style="list-style-type: none"> ● Selective dorsal rhizotomy
Improve flexibility	<ul style="list-style-type: none"> ● Yoga

Tone



IF YOU WANT TO...	THERAPIES THAT CAN HELP
Reduce spasticity	<ul style="list-style-type: none"> ● Botulinum toxin with occupational therapy; selective dorsal rhizotomy; intrathecal baclofen; diazepam ● Oral baclofen; botulinum with physiotherapy; transcranial direct stimulation; hippotherapy; acupuncture; whole body vibration; neurodevelopmental therapy; tizanidine
Improve gait kinematics	<ul style="list-style-type: none"> ● Selective dorsal rhizotomy
Improve cervical dystonia	<ul style="list-style-type: none"> ● Botulinum toxin
Reduce dystonia	<ul style="list-style-type: none"> ● Transcranial direct stimulation; deep brain stimulation; gabapentin

Contractures and alignment



IF YOU WANT TO...	THERAPIES THAT CAN HELP
Reduce hip displacement	<ul style="list-style-type: none">● Hip surveillance● Reconstructive hip surgery
Increase passive range of movement	<ul style="list-style-type: none">● Botulinum toxin with casting; serial lower limb casting
Correct scoliosis	<ul style="list-style-type: none">● Scoliosis surgery
Improve ankle passive range	<ul style="list-style-type: none">● Single event multi-level surgery; assistive technology robots
Improve knee passive range	<ul style="list-style-type: none">● Single event multi-level surgery; soft tissue crouch surgery
Reduce internal rotation hip	<ul style="list-style-type: none">● Soft tissue pelvis surgery
Reduce foot deformity	<ul style="list-style-type: none">● Equinus correction
Reduce hip rotation	<ul style="list-style-type: none">● Femoral osteotomy
Improve thumb posture	<ul style="list-style-type: none">● Hand surgery
Prevent hip displacement	<ul style="list-style-type: none">● Selective dorsal rhizotomy; postural management
Improve active range	<ul style="list-style-type: none">● Biofeedback
Improve passive range	<ul style="list-style-type: none">● Upper limb casting; whole body vibration

Pain



IF YOU WANT TO...	THERAPIES THAT CAN HELP
Reduce pain	<ul style="list-style-type: none">● Radio frequency dorsal root ganglion; intrathecal baclofen; botulinum toxin; massage; animal assisted therapy; gabapentin; scoliosis surgery; salvage hip surgery; sleep system; deep brain stimulation

Sleep



IF YOU WANT TO...	THERAPIES THAT CAN HELP
Improve sleep	<ul style="list-style-type: none">● Sleep hygiene; obstructive apnoea surgery; melatonin; sleep system; cranial sacral surgery; massage

Lungs



IF YOU WANT TO...

THERAPIES THAT CAN HELP

Improve lung function	● Exercise; assistive technology seating
Reduce hospital stay	● Airway clearance physiotherapy
Improve diaphragm inspiration	● Votja therapy

Mealtime



IF YOU WANT TO...

THERAPIES THAT CAN HELP

Improve feeding	● Electrical stimulation with oral therapy ● Parent education; oral sensory motor therapy
Improve chewing	● Oral sensory motor therapy
Improve mealtime safety	● Gastrostomy
Improve safe swallow	● Dysphagia compensation; oral sensory motor therapy
Reduce reflux	● Fundoplication
Improve diet consistency	● Oral sensory motor therapy
Reduce tongue thrust	● Oral sensory motor therapy

Drooling and oral health



IF YOU WANT TO...

THERAPIES THAT CAN HELP

Reduce drooling	● Botulinum toxin with occupational therapy; electrical stimulation with oral motor therapy ● Glycopyrrolate; scopolamine; behavioural interventions; trihexyphenidyl; oral sensory motor therapy
Improve dental hygiene	● Dental care

Communication



IF YOU WANT TO...

THERAPIES THAT CAN HELP

Improve literacy	● Literacy interventions using communication devices
Improve communication	● Augmentative and alternative communication; eye gaze ● augmentative and alternative communication; social stories
Improve peer interactions	● Augmentative and alternative communication
Improve partner communication	● Augmentative and alternative communication
Supplement verbal speech	● Augmentative and alternative communication
Improve communication interactions	● Language therapy

The mind



IF YOU WANT TO...

THERAPIES THAT CAN HELP

Improve reading	● Literacy interventions using communication devices
Improve cognition	● Goals-activity-motor enrichment; general stimulation; assistive technology ● robotics; general early stimulation; umbilical cord blood; neural stem cells
Improve play	● Assistive technology robotics; play therapy
Improve attention	● Yoga
Improve mindfulness	● Yoga

Self-care and function



IF YOU WANT TO...

THERAPIES THAT CAN HELP

Improve self-care	● Goal-directed training; home program using goal-directed training ● CO-OP; context focused therapy; animal assisted therapy; massage
Reduce stress	● Acceptance and commitment therapy; Stepping stones triple P ● Parent education; dysphagia management parent education; respite
Improve quality of life	● Physical activity; conductive education
Improve child behaviour	● Social stories
Improve coping	● Play therapy; coaching

Improve independence ● Assistive technology adaptive equipment

Improve socialisation ● Animal assisted therapy

Parent outcomes



IF YOU WANT TO...

THERAPIES THAT CAN HELP

Improve quality of life

- Stepping stones triple P
- Physical activity; conductive education

Improve child behaviour

- Stepping stones triple P
- Social stories

Improve parenting skills

- Coaching; parent education; solution focused therapy

Decrease burden

- Assistive technology adaptive equipment
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Antenatal prevention



IF YOU WANT TO...

THERAPIES THAT CAN HELP

Improve antenatal neuroprotection

- Corticosteroids; magnesium sulphate

Reduce hypertension

- Antihypertensives

Reduce preterm birth

- Betamimetics; progesterone
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Finding more information

You can find copies of both papers at the links below.

2013 Paper

A Systematic Review of Interventions for Children With Cerebral Palsy: State of the Evidence
<https://onlinelibrary.wiley.com/doi/epdf/10.1111/dmcn.12246>

2019 Paper

State of the Evidence Traffic Lights 2019: Systematic Review of Interventions for Preventing and Treating Children with Cerebral Palsy
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7035308/pdf/11910_2020_Article_1022.pdf

Implementing evidence-based interventions into clinical practice

A key benefit of this paper is that it allows us to bring more evidenced-based practice interventions to the frontline and to our families. Here's an example of how this research can be used to deliver better outcomes.

Meet Jayden. He is 8 years old, and lives with a diagnosis of Spastic Diplegia Cerebral Palsy.

Jayden has been accessing CPA expertise since he was three years old.

For his most recent NDIS plan, Jayden's therapist worked with him and his family to identify key goals, one of which was learning how to tie his shoelaces.

There might be a few things that are stopping Jayden from being able to tie his shoelaces – limited task knowledge, reduced dexterity, or perhaps some muscle weakness affecting his fine motor skills and motor planning.

In order to tie his shoelaces, there are two interventions which might be applicable for Jayden:

- **Action Observation Training:** this type of therapy involves the client observing a demonstration of an activity, and then performing that task to the best of their ability.
- **CO-OP:** Cognitive Orientation to Occupational Performance is a client centred intervention, where a therapist supports and guides the child to discover their own strategies to achieve the goals.

Using the paper, Jayden's therapist can see the CO-OP intervention has been graded with a strong yellow light, with promising evidence for effectiveness. Studies have also shown this intervention can achieve the same level of results whether it is delivered at a high or low intensity, and that the intervention can also improve self-esteem.

She can also see that the Action Observation intervention has been graded with a green light, indicating there is high-quality evidence for the intervention's effectiveness.

After discussing the options with Jayden's family in more detail, they decide to try a block of CO-OP at the lower intensity, conducted once a week over a ten week period. They also decide to add Action Observation intervention to supplement CO-OP over the same period of time.

Who is CPA?

Cerebral Palsy Alliance (CPA) is a leading provider of early childhood intervention services throughout NSW and ACT. We support children aged 0-6 years, and beyond, who are living with a range of physical and neurological conditions.

Conditions we support include cerebral palsy, autism, global development delay, acquired brain injury, muscular dystrophies, stroke and genetic syndromes.

We work closely with our families to create a personalised and family-centred approach to suit every child's individual developmental needs.

Start your journey with us today and let us help your child reach their greatest outcomes.



Call us on 1300 888 378



Email us at ask@cerebralpalsy.org.au



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