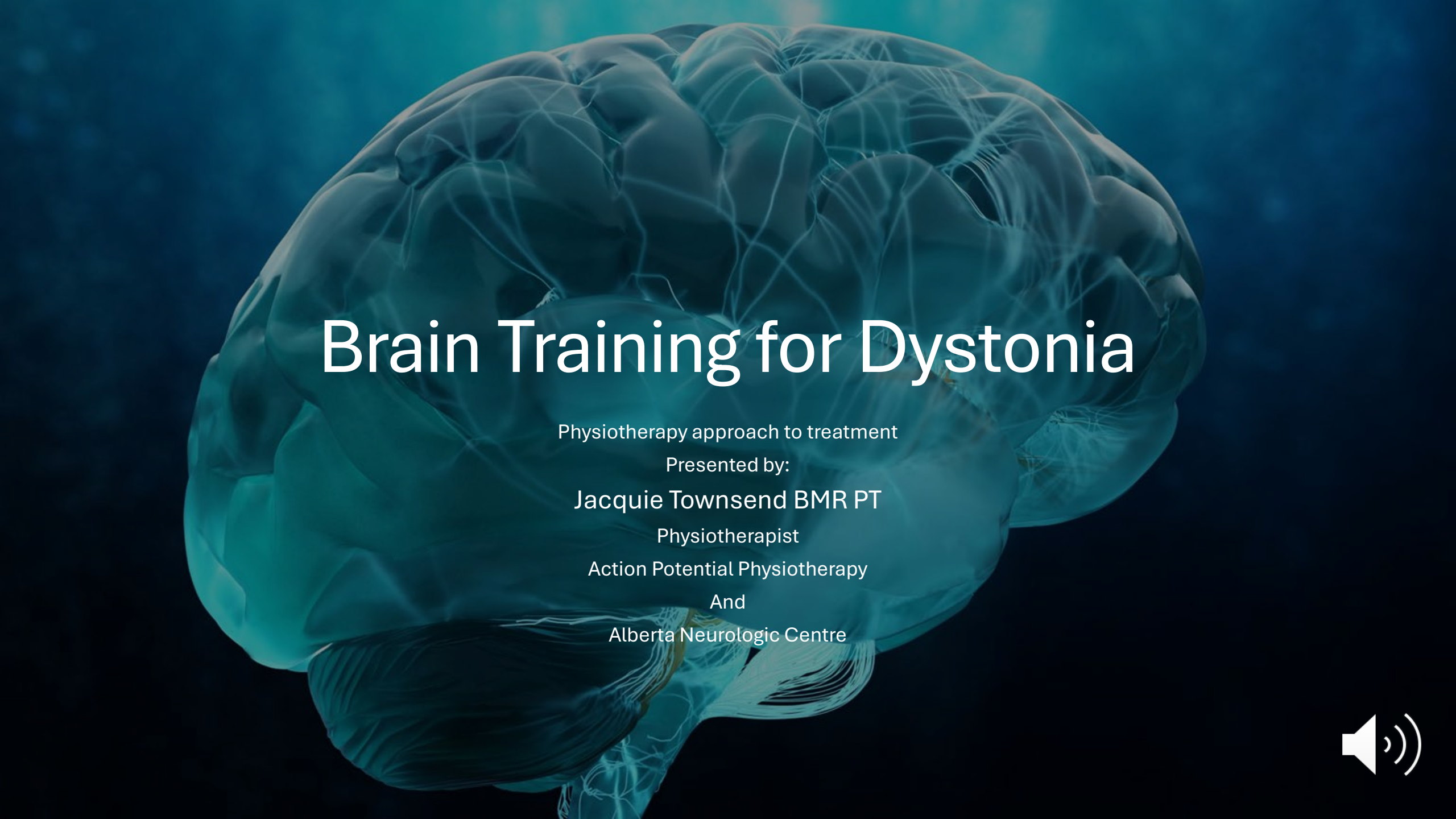


Brain Training for Dystonia

Physiotherapy approach to treatment

Presented by:

Jacquie Townsend BMR PT

Physiotherapist

Action Potential Physiotherapy

And

Alberta Neurologic Centre

Objectives

- Finding your physiotherapist
- Maximizing neuroplasticity
- Evidence summary

About your speaker

- *Disclosures and Conflict of interest: None*
- Bachelor of Medical Rehabilitation in Physiotherapy, University of Manitoba in 2008.
- Pediatrics, long term care, palliative care and acute in-patient rehab in rural setting. Foothills Medical Centre and South Health Campus outpatient neurology for 13 years.
- Action Potential Physiotherapy and Alberta Neurologic Centre
- Advanced training in Parkinson's Disease and partnership with Parkinson Alberta, Vestibular Competency Certification, multiple sclerosis certified specialist.
- Founding member of the Functional Neurological Disorders (FND) Society with published research on the program created at the South Health Campus.
- Completed courses related to neuroplasticity, sensorimotor rehabilitation, falls prevention, concussion management, acupuncture certified, and the McKenzie Method®, a spinal assessment and treatment model.

Are you a “neuro”-physio?

- Physiotherapist or Physical Therapist or PT- Bachelor, Masters or Doctorate
  - Generally qualified to treat disease, injury or deformity by physical methods such as manual treatment, modalities (heat, electrotherapy, etc) and exercise.
  - Post graduate studies in various areas: cardiorespiratory, musculoskeletal, oncology, paediatrics, pain, seniors health, sports medicine, pelvic floor, womens health, hands, wounds care, vestibular, neurology
  - Specialist Physiotherapist-
    - Canadian Physiotherapy Association or American Board of Physical Therapy Specialties. Minimum 5 years clinical experience. Peer reviewed exam or demonstration of knowledge.

Cardiorespiratory

Diana Hopkins-Rosseel

Judy Kay

Maggie McIlwaine

Oncology

Oren Cheifetz

Anne Rankin

Marize Ibrahim

Paediatrics

Barbara C. Kelly

Gail Kirkwood

Seniors' Health

Helen Johnson

Todd Wolansky

Musculoskeletal

Jasdeep Dhir

Jeffrey Begg

Maureen Dwight

Patricia Fonstad

Teresa A. Gravelle

Carol Kennedy

Audrey Long

Lorrie Lynne Maffey

Susan Massitti

Jill Robertson

Paolo Sanzo

Geoff Schneider

Kathryn Schneider

Jacqueline Sadi

Neurosciences

Rebecca Gruber

Joan Heard

Jacqueline Levy

Alison McDonald

Pain Science

Cory Choma

Dominique Gilbert

Janet Holly

Michael Sangster

Women's Health

Kelli Berzuk

Marcy Dayan

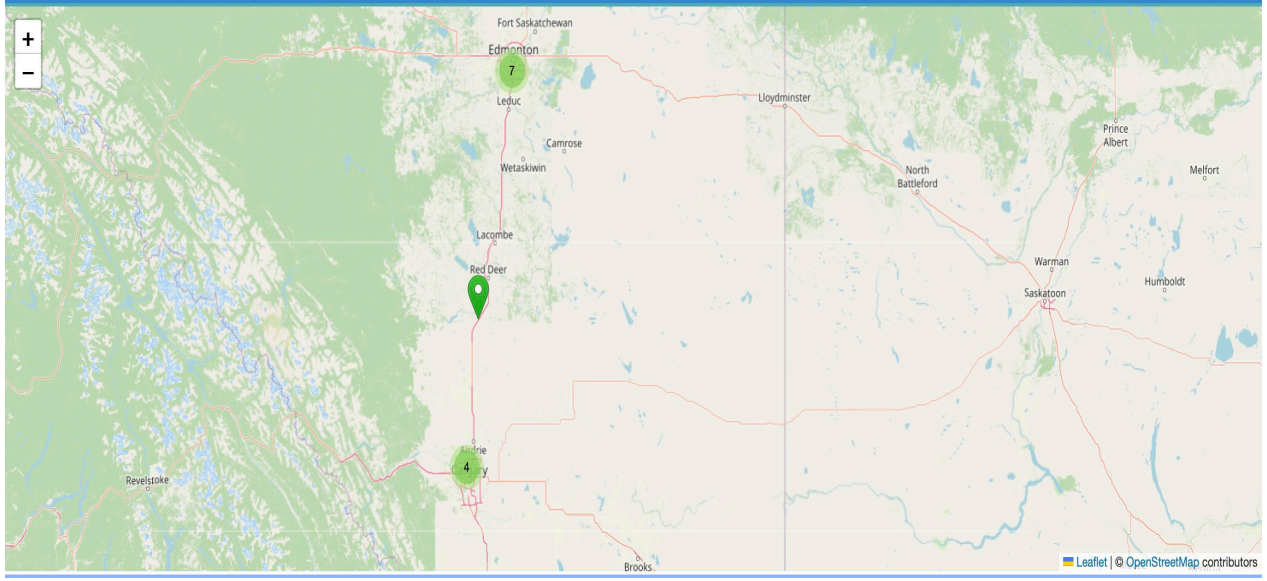
Christine Epp

Diane Lee

find.albertaphysio.com

Alberta Association of Physiotherapy

Find a Physio



Search for an Alberta Physiotherapist

Search by Name | Your Address (Address, Postal Code, City/Town) | Physiotherapists (Physiotherapist or Clinic) | 50 km | Search | Advanced Filters | Reset Filters | Export

11 Therapists Found

dystoniacanada.org

About Us | About Dystonia | Research | Resources | Get Involved | Dy

Physiotherapists and Clinics who work with Dystonia Patients

BRITISH COLUMBIA

Dystonia Trained Physiotherapists:

Sally-Anne Stelling, UBC Physio and Research Clinic, (Vancouver, BC) sallyanne.stelling@ubc.ca

Trineta Bhojwani, CPRI Med and Rehab, (Vancouver/New West, BC) https://www.cprihealth.ca/

Clinics:

Cairn Physiotherapy (BC) https://michellereadpersonaltrainingforfocaldystonia.weebly.com/#/

Michelle Read - Michelle has cervical dystonia. She sees clients by Zoom.

NeuroFit BC, www.neurofitbc.com (Victoria, BC) info@neurofitbc.com (778) 366 2427

ALBERTA

Dystonia Trained Physiotherapists:

Sarah Pletsch, PT: Neuro Centered Rehabilitation and Wellness Community Ltd., In Home and Telehealth Services. (Edmonton, AB) www.neurocentered.ca neurocentered@gmail.com 780-850-0740

Jacquie Townsend, BMR PT, Physiotherapist: Action Potential Physiotherapy, in-home and virtual services only, (Calgary, AB) www.actionpotentialphysiotherapy.com actionpotentialphysiotherapy@outlook.com (403) 835-7006

ONTARIO

Dystonia Trained Physiotherapists:

Alex Bergin, Bergin Motion, (Barrie, ON) alex@berginmotion.ca 705-252-0330

Finding your physiotherapist

Call the Alberta-wide Rehab Advice Line

Toll Free: 1-833-379-0563

- The service can:
- assess your rehabilitation needs over the phone
- speak to parents, guardians or caregivers about a child’s development or well-being
- give advice on activities and exercises that help with physical, functional, or developmental concerns
- provide strategies to manage the day-to-day activities affected by these concerns.
- link you to rehabilitation services

Read the Bio for clues.

Do they have experience working with people with neurological conditions?

Are they familiar with dystonia?

What experience do they have or what courses have they taken to support their practice?

Are they willing to learn and work with you?

Online program

Funding

AHS FUNDED PROGRAMS

PRIVATE PHYSIOTHERAPY IS OUT OF POCKET BUT CAN BE COVERED BY HEALTH INSURANCE AISH OR VETERAN AFFAIRS

HTTPS://BOTOX.ABBVIECARE.CA

OR XEOMIN AXCESS ADVANTAGE PROGRAM

abbvie care with you

Support Program

Enrollment form for BOTOX®

Please fax the completed form to 1-833-570-0188
For any questions, or to register by phone or email, please call 1-833-570-0818 or email BOTOX@abbviecare.ca

Please note that the only SECURE way to transfer this information is by fax or phone.

PATIENT INFORMATION

First name:

Last name:

Date of birth (dd/mm/yyyy):

Gender ☐ M ☐ F ☐ Other

Health card number:

Address:

City:

Province:

Postal code:

Email:

Home phone:

Mobile (standard SMS rates may apply):

Language preference: ☐ **English** ☐ **French**

☐ **Other:** _____

Preferred method of communication:
☐ **Phone** ☐ **Mobile** ☐ **Email**

Best time to contact patient:
☐ **Morning** ☐ **Afternoon** ☐ **Evening** ☐ **No preference**

Meets criteria for:
Private insurance: ☐ **Yes** ☐ **No**

Insurance company: _____

Public insurance: ☐ **Yes** ☐ **No**

I acknowledge that I have read the AbbVie Care Consent Information and Disclosure (see reverse), and that I consent to the collection, use, and disclosure of my personal information in accordance with these terms.

Patient signature and date required for consent to be valid.

Patient signature: _____

Date (dd/mm/yyyy): _____

Patient caregiver/legal guardian signature
(if the patient is under 18 years old):

_____

Relationship to patient: _____

Date (dd/mm/yyyy): _____

☐ Please check here if you do not want to be contacted for market research purposes.

PHYSICIAN INFORMATION (to be completed by the physician)

Name:

License number:

Address:

City:

Province:

Postal code:

Phone:

Fax:

Email:

Preferred method of communication:
☐ **Phone** ☐ **Fax** ☐ **Email**

Special considerations:

I hereby acknowledge that I am the patient's attending physician. I authorize AbbVie Care to be my designated agent to forward this prescription by fax, or other mode of delivery, to the pharmacy chosen by the above named. This prescription represents the original prescription drug order. The patient's chosen pharmacy is the only intended recipient and there are no others.

Physician signature: _____

Date (dd/mm/yyyy): _____

☐ An authorized representative/legal guardian may provide consent and sign this enrollment form on behalf of my patient.

Rx (check a diagnosis and dosage)

☐ **Chronic migraine**
☐ **Adult focal spasticity**
☐ **Pediatric focal spasticity (≥2 years of age)**
☐ **Blepharospasm**
☐ **Strabismus**
☐ **Cervical dystonia**

BOTOX (onabotulinumtoxinA)

☐ **50 units x _____ vial(s), Refills _____**
☐ **100 units x _____ vial(s), Refills _____**
☐ **200 units x _____ vial(s), Refills _____**

Frequency: q _____ months

Sig: IM injection by the physician as directed

BOTOX should only be given by physicians with the appropriate qualifications and experience in the treatment and the use of required equipment

Programme d'avantage AXCESS Advantage Program

HEALTH CLAIM FORM
Formulaire de Demande de Remboursement

Patient's Full Name / Nom complet du patient:

Program Name / Nom du programme: XEOMIN Axcess Advantage Program

Group # / N° de groupe : 32332

Certificate# / N° de certificat :

(Call the pharmacy associated with this clinic for your certificate number or speak with the clinic nurse or admin. / Appelez la pharmacie associée à cette clinique pour obtenir votre numéro de certificat ou parlez à l'infirmière ou à l'administrateur de la clinique.)

Date of Birth / Date de naissance D / M / Y J / M / A

Patient's Address / Adresse du patient

Street Name & Number / Rue Nom et Numéro

Apt. / App.

City / Ville

Province

Postal Code / Code Postal

Telephone No. / N° de téléphone

Language Preference / Langue de préférence
☐ English / Anglais
☐ French / Français

EXPENSES (OTHER THAN DRUGS) – Include the receipts for therapeutics services or equipments you've purchased.
FRAIS MÉDICAUX (AUTRES QUE MÉDICAMENTS) – Inclure les reçus pour le ou les services thérapeutiques ou les équipements que vous avez achetés.

Instructions to submit your claim:

1. Complete this form entirely.
2. Ensure the Certificate number is included at the top right section of the form.
3. Include your receipts for the therapeutic services or equipments you've purchased.
4. Include your XEOMIN prescription or a XEOMIN prescription drug receipt.
5. Send these documents as indicated below, by mail or email.
6. Reimbursement to be made within 4 to 6 weeks following reception of your request.

Instructions pour soumettre votre réclamation :

1. Remplissez entièrement ce formulaire.
2. Assurez-vous d'ajouter le numéro de certificat dans la section en haut à droite de ce document.
3. Incluez vos reçus pour le ou les services thérapeutiques ou les équipements que vous avez achetés.
4. Incluez votre ordonnance de XEOMIN ou reçu de médicament sur ordonnance pour XEOMIN.
5. Faites parvenir ces documents tel qu'indiqué plus bas, par la poste ou par courriel.
6. Le remboursement sera effectué dans les 4 à 6 semaines suivant la réception de votre demande.

*** Note: Do NOT staple or tape receipts to the claim form. Please include the receipts loosely. ***
*** Remarque : NE PAS agrafer NI coller les reçus au formulaire de demande de remboursement.Veuillez laisser les reçus libres. ***

I certify that the above information is true and complete and that the above charges were for goods and services received by me.
Je certifie que l'information ci-dessus est véridique et complète, et que les frais mentionnés sont pour des produits et des services reçus par moi-même.

I authorize ClaimSecure, healthcare professionals, insurers, administrators of government or other benefit plans, and other service providers working with ClaimSecure to exchange necessary information regarding this claim to administer my health benefit plan.
J'autorise SecurIndemnité, les professionnels de la santé, les assureurs, l'administration publique ou d'autres régimes de prestations, ainsi que les autres fournisseurs de services qui collaborent avec SecurIndemnité à partager tout renseignement concernant cette demande d'indemnité nécessaire pour l'administration de mon régime de prestations pour soins de santé.

Date

Patient's Signature / Signature du patient

All information recorded on this form is confidential / Tous les renseignements inscrits sur le présent formulaire sont confidentiels

Send all claims and inquiries to / Veuillez faire parvenir toute demande d'indemnisation et de renseignements à:

CLAIMSECURE INC.
PO 6500 Station A Sudbury, ON P3A 5N5
service@claimsecure.com (with subject: XEOMIN/avec sujet : XEOMIN)

For physician use only/ Pour l'utilisation d'un médecin seulement

Recommendation/Recommandation	
Physician's name / Nom du médecin	**Physician's signature / Signature du médecin**

MTB-555

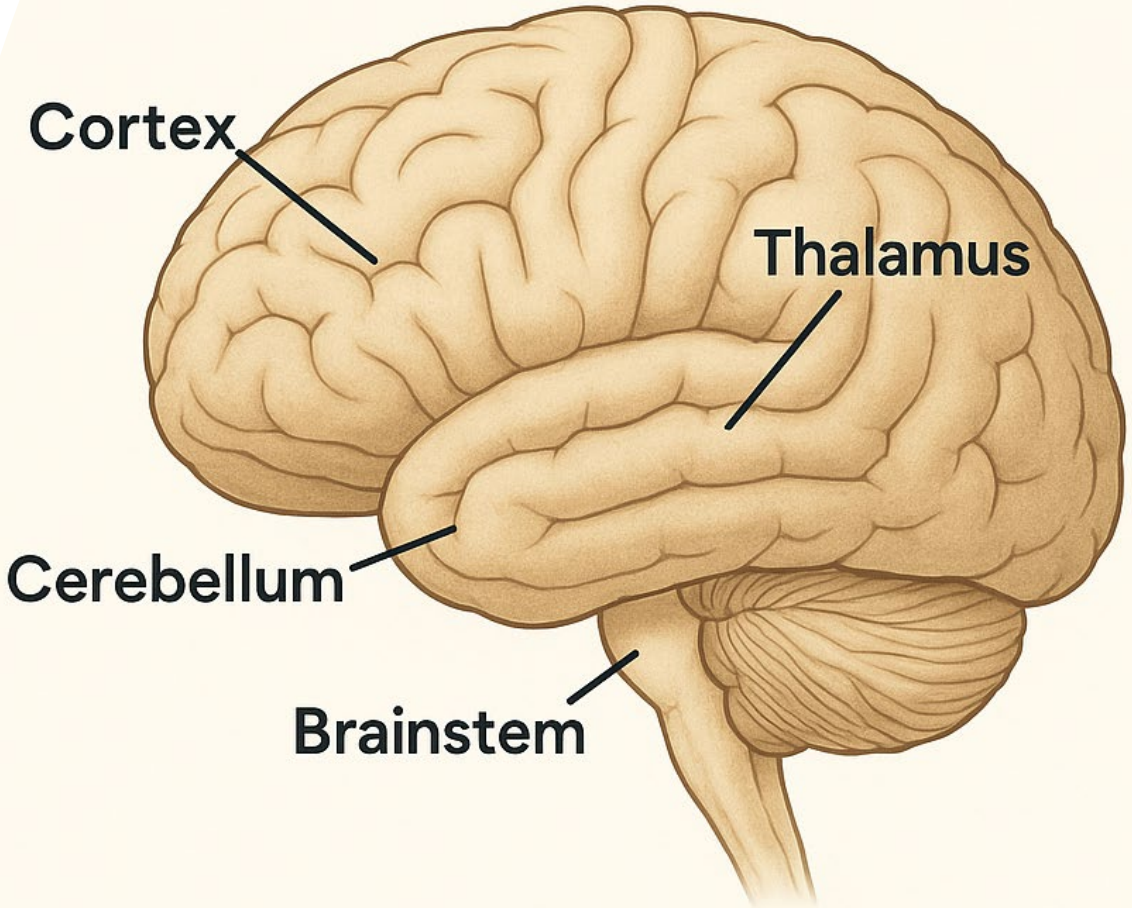
Neuroplasticity

Neuroplasticity: the brain’s ability to reorganize itself by structure or function in response to experience, disease or injury.

Unfortunately, plasticity can be maladaptive where new brain connections can be problematic, like in dystonia.

- Dysfunctional basal ganglia
- Abnormal brain activity and patterns lead to involuntary muscle contractions.
- **Overactive brain plasticity** and **impaired inhibition** in motor areas make the brain "learn the wrong movements" and keep reinforcing them.

DYSTONIA



Abnormal Communication Between Brain Regions

PROMOTING NEUROPLASTICITY

PHYSICAL EXERCISE

REPETITION WITH VARIATION

FOCUSED ATTENTION

SALIENCE / MEANING

NOVELTY AND CHALLENGE

SLEEP

NUTRITION

REDUCED STRESS

MENTAL TRAINING & COGNITIVE CHALLENGE

SOCIAL INTERACTION

ERGONOMIC

OPTIMAL Theory

Optimizing
Performance
Through
Intrinsic
Motivation and
Attention for
Learning

Focuses on what the learner wants to do and how skilful movement can achieve that goal

Self-efficacy- confidence to achieve a task

Enhanced expectancies- belief or hope.

Can be enhanced by positive feedback, rewards and setting small goals\

Autonomy- choice or control

Attention- internal (focus on limb or movement) vs external (focus on target)

Visualization

- Mental practice
  - Combined with physical practice
  - More effective when vividly imagined
  - Practiced regularly

Motor learning

- Motor learning: a set of processes based on principles of neuroplasticity associated with practice or experience that lead to relatively permanent motor changes.
  - Intensive rehabilitation intervention with high task repetitions
  - Progressive increase in difficulty
  - Salient intervention
  - Feedback

High repetitions

- Up to 30-60 minutes of practice per day for several months.
- Break the sessions up into 10–15-minute increments.
- 10-20 repetitions of controlled movement repeated up to 5 times
- Maintaining posture for 1-2 minutes.

Progression

- Start with high quality technique
  - Limit distraction
  - Supported posture
  - Slow and small movement

Increase repetitions
Increase speed
Practice smooth and fluid motion
Change the practice setting
Distraction
Dual task
Vary the condition

70-80% success rate

Salience

Your brain is constantly processing sensory inputs but filters out the irrelevant information.

When a task is meaningful, your brain can allocate more attention to it, which supports neuroplasticity.

Salient tasks more easily transfer into daily life.

A meaningful task boosts our motivation and reward systems which enhance changes.

Feedback

- Feedback gives your brain information about how well it performed the desired task, allowing for adjustments for improvement over time.
- Intrinsic: your own feelings/sensations
- Extrinsic: external observations such as feedback from a therapist, recording, mirror or touch.
- Early feedback is helpful to avoid practicing bad habits.
- Reduction of feedback is a progression

Reward

- Money, praise, music or video gaming
- Reward accelerates learning speed
- Skill retention

Kassaye *et al. BMC Neurology* (2024) 24:53
https://doi.org/10.1186/s12883-023-03473-3

BMC Neurology

RESEARCH Open Access

The effectiveness of physiotherapy for patients with isolated cervical dystonia: an updated systematic review and meta-analysis

Shimelis Girma Kassaye[1,2], Willem De Hertogh[2], David Crosiers[3,4], Esayas Kebede Gudina[1] and Joke De Pauw[2*]

Abstract

Background Cervical dystonia is a movement disorder typically characterized by a patterned and twisting movement of sustained or intermittent muscle contractions. Recently, new clinical trials are emerging, highlighting the potential benefit of physiotherapy (PT) on disease outcomes. Thus, the objective of this review is to update the effectiveness of PT on cervical dystonia disease outcomes and subsequently perform a meta-analysis.

Methods Interventional studies published in English with adult patients with isolated cervical dystonia following a physiotherapy program were included. Relevant articles were searched in PubMed (MEDLINE), Web of Science, and Scopus. Cochrane and Joanna Briggs Institute risk of bias checklists were used for quality reporting. Meta-analysis was done using Review Manager 5.3 statistical software and a pooled mean difference for pain was presented.

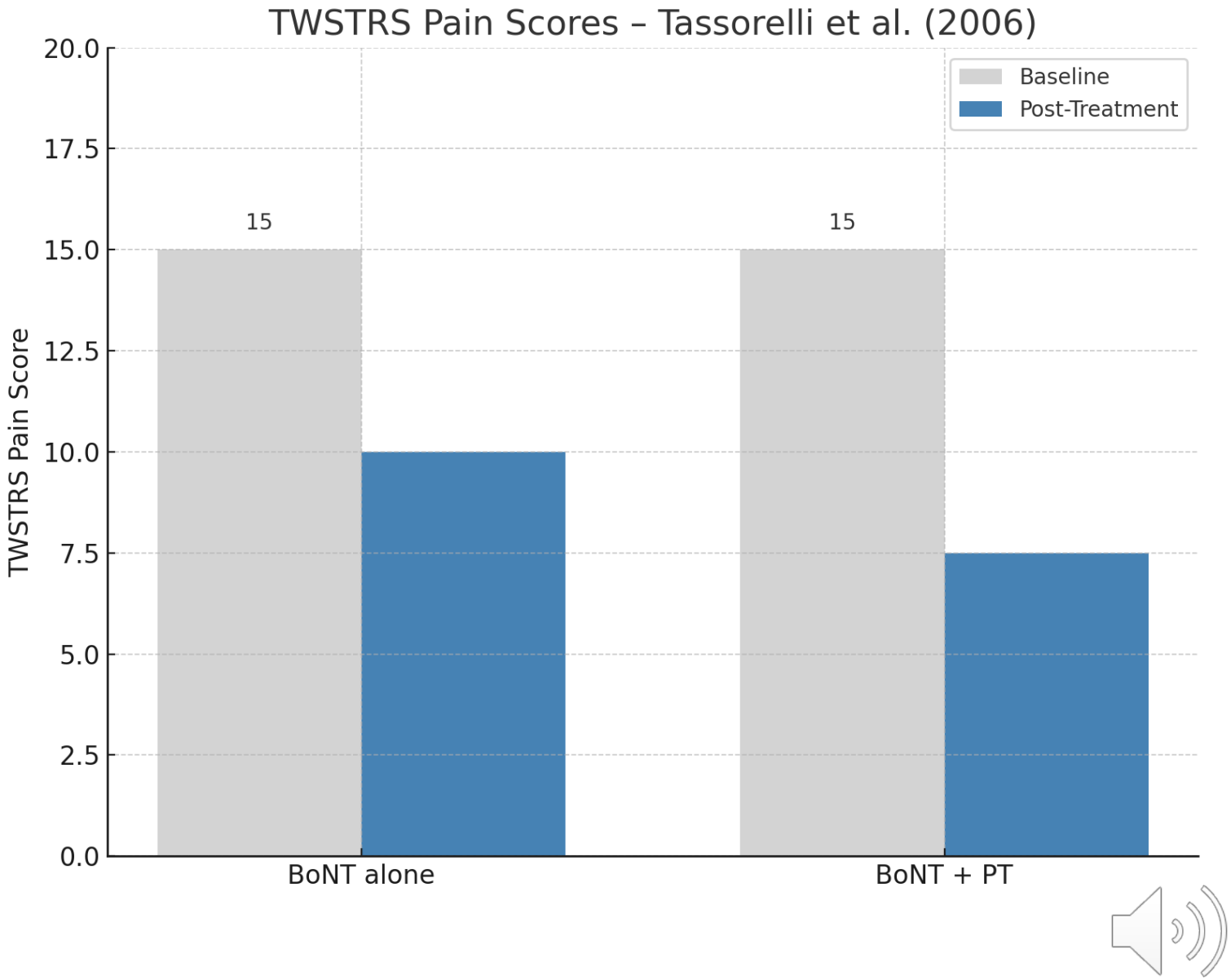
Results Fourteen articles were included in the review and two articles were included in the meta-analysis. The meta-analysis revealed that PT intervention had a significant effect on pain reduction scale (-5.00, 95% CI -6.26, -3.74) when used as an additional therapy with botulinum toxin (BoNT) injection. Additionally, findings indicate a possible positive effect of PT disease severity, disability, and quality of life.

Conclusions Physiotherapy in addition to BoNT is recommended to decrease pain. The findings suggest a reduction of disease severity, disability, and improvement in quality of life. The variety in the type and duration of PT interventions did not allow a clear recommendation of a specific type of PT.

Keywords Cervical dystonia, Torticollis, Physiotherapy, Physical therapy

Primary Author	Year	Participants (n)	Intervention Type	Main Findings
Tassorelli	2006	40	Multimodal PT (passive myofascial elongation, deep massage, biofeedback, active stretching) + BoNT	Significant pain reduction and improved disability vs. BoNT alone
Hu	2019	30	Home exercise program after 1 supervised PT session (6 weeks) + BoNT	~30% reduction in TWSTRS score (pain & severity) compared to BoNT alone
Counsell	2016	72	Specialized PT program vs. standard PT, both + BoNT	Both improved pain and disability; no significant difference between PT types
Van den Dool	2019	60	Specialized PT emphasizing motor training vs. standard PT, both + BoNT	Improvement in dystonic postures and disability in both groups; no clear difference between PT types
Puttaraksa	2016	32	Active exercise & relaxation therapy (PT alone — no BoNT in some participants)	Improvement in pain and QoL
Gürcay	2016	24	Kinesiotaping + BoNT vs. BoNT alone	Short-term pain reduction with kinesiotaping
Fusco	2016	48	Multimodal PT (details unclear) + BoNT	Improvement in pain and disability
Karadaş	2017	35	Kinesiotaping + BoNT vs. BoNT alone	Short-term pain reduction; no significant change in severity

TWSTRS Pain Scores – Tassorelli et al. (2006)



RCT's for other types of dystonia

Study	Participants	Intervention	Main Finding
Breen et al. (2008)	21	Re-training: pen-writing vs. putty exercises after immobilization	Both significantly improved writer's cramp and arm function (pmc.ncbi.nlm.nih.gov)
Baur et al. (2020)	12	BoNT plus OT vs. BoNT alone	Combined therapy improved objective impairment more (~28% gain in WCIS)

Rehabilitation summary

Best when combined with Botulinum Toxin- get to work shortly after injection.

Keep working- we don’t have an optimal duration for rehabilitation.

We don’t have many “specialist” physiotherapists and evidence shows you can still access quality care without one. Speak with your PT about your symptoms and work together.

Exercises to re-educate posture, strengthen weak muscle and lengthen tight ones.

Sample treatment based on neuroplasticity for cervical dystonia

Find	Find your physiotherapist to help you design your program.
Select	**Salience**: Select your specific movement goal. • “I want to be able to turn my head to reach for my drawer while I’m in the kitchen”
Prepare	Prepare your brain: practice a positive outlook, achieve exercise, diet, sleep and hydration goals.

Sample treatment based on neuroplasticity for cervical dystonia cont.....

- Perform 1-2 minutes of relaxed breathing to release tension in postural muscles and reduce stress. Use this time to **visualize** success with the goal and boost your confidence/**self-efficacy.**

- **Progression**: Start in a position where it is easiest to move, move slowly and focus on quality. Gradually add changes to speed, position, reduced feedback and speed.

Sample treatment based on neuroplasticity for cervical dystonia cont.....

- **High Repetition**: Perform 15 minutes of exercise, 2-4 times per day.
  - Perform the movement 10-20 times. Repeating for 5 sets.
- **Feedback**: this can be visual such as lining up with a target on a mirror, using a head mounted laser pointer and a wall target, using kinesiotape, or resistance bands.
  - Gradually reduce the amount of external feedback
- Have fun with the program and use **rewards** to reinforce your learning.

Thank you for your time

- Jacquie Townsend
- (403)835-7006
- Jacquie@actionpotentialphysiotherapy@outlook.com
- www.actionpotentialphysiotherapy.com
- https://www.ancentre.ca

References

- Krakauer, J., Ghilardi, MF. & Ghez, C. Independent learning of internal models for kinematic and dynamic control of reaching. *Nat Neurosci* **2**, 1026–1031 (1999). https://doi.org/10.1038/14826
- Hu W, Wagle Shukla A, et al. (2019). A randomized study of botulinum toxin versus botulinum toxin plus physical therapy for treatment of cervical dystonia. Parkinsonism & Related Disorders. 65, 185–190.
- Counsell C, Sinclair H, Fowlie J, et al. A randomized trial of specialized versus standard neck physiotherapy in cervical dystonia. Parkinsonism Relat Disord. 2016;23:72–79. doi:10.1016/j.parkreldis.2015.12.010
- Woolfolk, R. L., Parrish, M. W., & Murphy, S. M. (1985).
- The effects of imagery capacity and imagery practice on the performance of a basketball task.Journal of Sport Psychology, 7(2), 191–197.
- Wulf G, Lewthwaite R. Optimizing performance through intrinsic motivation and attention for learning: The OPTIMAL theory of motor learning. Psychon Bull Rev. 2016 Oct;23(5):1382-1414. doi: 10.3758/s13423-015-0999-9. PMID: 26833314.
- Tassorelli C, Mancini F, Balloni L, Pacchetti C, Sandrini G, Nappi G, Martignoni E. Botulinum toxin and neuromotor rehabilitation: An integrated approach to idiopathic cervical dystonia. Mov Disord. 2006 Dec;21(12):2240-3. doi: 10.1002/mds.21145. PMID: 17029278.
- Callahan J, Shrotri SS, Raje SN, Beninato M. Non-surgical and non-pharmacological interventions for cervical dystonia: A systematic review. *Physiotherapy Practice and Research*. 2015;36(1):1-14. doi:10.3233/PPR-140050
- Krakauer, John W., 'The applicability of motor learning to neurorehabilitation', in Volker Dietz, and Nick Ward (eds), *Oxford Textbook of Neurorehabilitation*, 1 edn, Oxford Textbooks in Clinical Neurology(Oxford, 2015; online edn, Oxford Academic, 1 Apr. 2015),
- De Pauw J, Van der Velden K, Meirte J, Van Daele U, Truijen S, Cras P, Mercelis R, De Hertogh W. The effectiveness of physiotherapy for cervical dystonia: a systematic literature review. J Neurol. 2014 Oct;261(10):1857-65. doi: 10.1007/s00415-013-7220-8. Epub 2014 Jan 12. PMID: 24413637.
- Loudovici-Krug D, Derlien S, Best N, Günther A. Physiotherapy for Cervical Dystonia: A Systematic Review of Randomised Controlled Trials. Toxins (Basel). 2022 Nov 11;14(11):784. doi: 10.3390/toxins14110784. PMID: 36422957; PMCID: PMC9694367.

- Kassaye, S.G., De Hertogh, W., Crosiers, D. *et al*. The effectiveness of physiotherapy for patients with isolated cervical dystonia: an updated systematic review and meta-analysis. *BMC Neurol* **24**, 53 (2024). https://doi.org/10.1186/s12883-023-03473-3
- Prell, T., Peschel, T., Köhler, B. *et al*. Structural brain abnormalities in cervical dystonia.*BMC Neurosci* **14**, 123 (2013) https://doi.org/10.1186/1471-2202-14-12
- Barıs, Muhammed. (2023). 6-week Results of Physiotherapy and Cognitive Behavioral Therapy in a Patient with Bilateral Lower Extremity Dystonia. Lokman Hekim Health Sciences. 230-233. 10.14744/lhhs.2023.50003.
- Avanzino L, Fiorio M. Proprioceptive dysfunction in focal dystonia: from experimental evidence to rehabilitation strategies. Front Hum Neurosci. 2014 Dec 9;8:1000. doi: 10.3389/fnhum.2014.01000. PMID:
- Castagna A, Caronni A, Crippa A, Sciumè L, Giacobbi G, Corrini C, Montesano A, Ramella M. Sensorimotor Perceptive Rehabilitation Integrated (SPRInt) program: exercises with augmented movement feedback associated to botulinum neurotoxin in idiopathic cervical dystonia-an observational study. Neurol Sci. 2020 Jan;41(1):131-138. doi: 10.1007/s10072-019-04061-5. Epub 2019 Sep 2. PMID: 31478151.
- van den Dool J, Visser B, Koelman JH, Engelbert RH, Tijssen MA. Cervical dystonia: effectiveness of a standardized physical therapy program; study design and protocol of a single blind randomized controlled trial. BMC Neurol. 2013 Jul 15;13:85. doi: 10.1186/1471-2377-13-85. PMID: 23855591; PMCID: PMC3718643.
- Bledsoe IO, Viser AC, San Luciano M. Treatment of Dystonia: Medications, Neurotoxins, Neuromodulation, and Rehabilitation. Neurotherapeutics. 2020 Oct;17(4):1622-1644. doi: 10.1007/s13311-020-00944-0. Epub 2020 Oct 23. PMID: 33095402; PMCID: PMC7851280.
- Zhao J, Zhang G, Xu D. The effect of reward on motor learning: different stage, different effect. Front Hum Neurosci. 2024 Mar 12;18:1381935. doi: 10.3389/fnhum.2024.1381935. PMID: 38532789; PMCID: PMC10963647.
- Abbviecare.ca
- Myxeomin.ca