Clinician's Commentary on Choi et al.¹

Spasticity affects functional abilities and increases caregivers' burdens.^{2,3} To address these issues, botulinum toxin type A (BoNTA) has recently been successfully used to manage spasticity after upper motor neuron lesions, such as stroke or cerebral palsy, have occurred. However, the main goals of the intervention are to rehabilitate and return function and to decrease disability, all of which improve a patient's quality of life. Although randomized trials have indicated a statistically significant effect of BoNTA on decreasing spasticity, its effect on improving active limb function is equivocal.^{4,5} Its impact has perhaps been less clear because of the types of assessment used to measure function. Standard clinical assessments of function such as the Barthel Index are indicators only of the overall assessment of bodily function, whereas BoNTA is a focal intervention on the muscles. Depicting changes in a standardized assessment with a battery of tasks would be difficult, whereas only a few sub-tasks would be affected by a BoNTA injection. As a result, it is unrealistic to expect to notice changes in standardized clinical assessments. To measure the effectiveness of BoNTA in an adult with spasticity, setting goals for intervention and evaluation of the intervention is recommended as a best practice guideline.⁶

Goal Attainment Scaling (GAS) is a measure that aims to assess the effectiveness of BoNTA. This measure has shown a clinically important change in geriatric care, mental health, and chronic pain settings.⁶ The strength and main feature of this tool are that it quantifies goal achievement through a single-interval measure ranging from not achieving to exceeding the goal. Because individuals with upper motor neuron syndrome are heterogeneous, individualized treatment goals based on their needs are meaningful to them and their family. However, GAS does not replace standardized measures, and its role is to facilitate communication and agreement between the patient or family and the treating rehabilitation team.⁷

Because spasticity management is required as an interdisciplinary approach, a common language such as the *International Classification of Functioning, Disability and Health (ICF)*⁸ would be more appropriate to categorize a patient's goals and measure changes.⁹ The ICF model is intended to be used as an outcome measure for assessment and evaluation.⁹ Choi and colleagues,¹ in a retrospective study in an outpatient setting, characterized the identified goals set by patients before receiving BoNTA injections using the ICF model and also examined whether the spasticity distribution affected the patients' identified goals. The authors indicated that the majority of patients (73%) with upper motor neuron syndrome, including stroke, cerebral palsy, acquired brain injury, and spinal cord injury, selected goals that were in the activities and participation domain. The rest of the goals were in the bodily function and structures categories, which are impairment based. This study also showed that there was no association between spasticity distribution and the category of goals set.

Choi and colleagues¹ also showed that patients with bilateral lower limb spasticity or only lower limb spasticity tended to set walking-related goals for BoNTA treatments and that patients with upper-limb spasticity set goals for self-care tasks such as dressing. An awareness of this result would be helpful in a fast-paced clinical setting because it would guide clinicians in assisting patients and their families with negotiating mutually realistic

goals. This result is novel because the lower limb goals were mapped to the ICF model, whereas in two previous studies,^{10,11} the patients' GAS goals were mapped to the ICF model—interestingly, with a similar distribution; however, those two studies focused only on the upper limb. In the study by Choi and colleagues,¹ most patients selected goals that required active participation rather than being impairment based, irrespective of the type of upper motor lesion or distribution of spasticity.

It is understandable that patients and their families prefer active tasks when setting their personal goals for rehabilitation; however, Turner-Stoke and colleagues¹¹ showed that, in patients with chronic spasticity, those goals were unrealistic and unachievable. In contrast, passive tasks such as sustaining joint range of motion or hand hygiene were achieved at a higher rate than the active goals. Similarly, pain-related goals were achieved successfully and at a higher rate than active goals. It is important to note that, during initial visits, assisting patients and their families to set realistic goals is crucial. A clinician's expertise and knowledge play a role in predicting the outcomes; they are then able to assist in negotiating appropriate, realistic, and achievable expectations and goals. Not achieving overly ambitious goals could cause distress to patients, families, and clinicians. It could also waste time that would have been better spent on achievable goals such as pain reduction and maintaining joint range, which are essential for contracture prevention and joint alignment. This could be a challenge for therapists, and it is one reason why they resort to standardized clinical assessments as a yardstick, but best practice for BoNTA is to set individualized goals.

It is noteworthy that even though GAS is a patient-centred tool, it is time consuming to administer in clinical settings and requires further clinical training; one way of dealing with these barriers is to use GAS to establish goal banks in different clinical practices, which can still be tailored to each patient. This speeds up the intervention and also prevents free-flowing goals.⁶

As a rule, clinicians must assist patients and their families on the basis of a patient's motor recovery stage. Educating them about the correlation between improvement in function and baseline limb impairment could be helpful in selecting realistic goals. Chang and colleagues¹² showed that motor recovery significantly influenced functional changes after reducing spasticity (using BoNTA). They showed that patients with a Chedoke-McMaster Stroke Assessment (CMSA) score of 4 or higher at baseline gained more functional improvement after a BoNTA injection. Meanwhile, the group with a CMSA score of 3 or lower did not improve upper limb function after receiving a BoNTA injection. The authors elaborated that patients with higher motor recovery participate in activities of daily life and would benefit more from rehabilitation interventions.

Because the main role of BoNTA is to reduce spasticity, it would be interesting to examine further whether the severity of spasticity (i.e., graded using the Modified Ashworth Scale) affects and is correlated with selecting goal categories from among the different types of upper motor neuron lesion and also with achieving these goals. This would be beneficial in establishing the correlation between GAS and the severity of spasticity.^{9,10}

In summary, irrespective of what condition they have, patients prefer selecting goals in the activities and participation domain; however, it is important that therapists have the expertise to negotiate mutual, realistic, and achievable goals based on a patient's motor recovery level. In some patients, achieving impairment-based goals will maintain the affected joint and muscle structure so that if active movement returns, patients will be able to function.

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REFERENCES

1. Choi K, Peters J, Tri A, et al. Goals set by patients using the ICF model before receiving botulinum injections and their relation to spasticity distribution. *Physiother Can.* 2017;69(2):113–9. <http://dx.doi.org/10.1038/ptc.2016-25>
2. Pandyan AD, Gregoric M, Barnes MP, et al. Spasticity: clinical perceptions, neurological realities and meaningful measurement. *Disabil Rehabil.* 2005;27(1-2):2–6. Medline:15799140 <http://dx.doi.org/10.1080/09638280400014576>.
3. Barnes MP. An overview of the clinical management of spasticity. In: Barnes MP, Johnson GR, editors. *Upper motor neurone syndrome and spasticity: clinical management and neurophysiology*. New York: Cambridge University Press; 2008. p. 1–8. <http://dx.doi.org/10.1017/CBO9780511544866.002>.
4. van Kuijk AA, Geurts AC, Bevaart BJ, et al. Treatment of upper extremity spasticity in stroke patients by focal neuronal or neuromuscular blockade: a systematic review of the literature. *J Rehabil Med.* 2002;34(2):51–61. Medline:12019580 <http://dx.doi.org/10.1080/165019702753557836>.
5. Ashford S, Turner-Stokes L. Goal attainment for spasticity management using botulinum toxin. *Physiother Res Int.* 2006;11(1):24–34. Medline:16594313 <http://dx.doi.org/10.1002/pri.36>.
6. Turner-Stokes L, Ward AB. Guidelines for the use of botulinum toxin in the management of spasticity in adults. *Clin Med (Northfield Ill).* 2002;2(2):128–30. <http://dx.doi.org/10.7861/clinmedicine.2-2-128>.
7. Eftekhari P, Mochizuki G, Dutta T, et al. Goal attainment scaling in individuals with upper limb spasticity post stroke. *Occup Ther Int.* 2016;23(4):379–89. Medline:27696580 <http://dx.doi.org/10.1002/oti.1440>.
8. World Health Organization. *International classification of functioning, disability and health*. Geneva: The Organization; 2001.
9. Cieza A, Brockow T, Ewert T, et al. Linking health-status measurements to the International Classification of Functioning, Disability and Health. *J Rehabil Med.* 2002;34(5):205–10. Medline:12392234 <http://dx.doi.org/10.1080/165019702760279189>.
10. Nott MT, Barden HL, Baguley IJ. Goal attainment following upper-limb botulinum toxin-A injections: are we facilitating achievement of client-centred goals? *J Rehabil Med.* 2014;46(9):864–8. Medline:25074437 <http://dx.doi.org/10.2340/16501977-1853>.
11. Turner-Stokes L, Baguley IJ, De Graaff S, et al. Goal attainment scaling in the evaluation of treatment of upper limb spasticity with botulinum toxin: a secondary analysis from a double-blind placebo-controlled randomized clinical trial. *J Rehabil Med.* 2010;42(1):81–9. Medline:20111849 <http://dx.doi.org/10.2340/16501977-0474>.
12. Chang CL, Munin MC, Skidmore ER, et al. Effect of baseline spastic hemiparesis on recovery of upper-limb function following botulinum toxin type A injections and postinjection therapy. *Arch Phys Med Rehabil.* 2009;90(9):1462–8. Medline:19735772 <http://dx.doi.org/10.1016/j.apmr.2009.03.008>.

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