

# Innovative Treatment for Elderly Patients with Contractures: A Clinical Experience

By Theresa A. Hurd

**T**his hand belongs to an elderly patient in a Canadian long-term-care facility. It was difficult to imagine that it once worked a long, hard day, gently stroked the forehead of a sick child or held another's hands close and intertwined. Now these hands are shriveled and wrinkled from years of living. The left hand held its own thumb in a tight, relentless grip, as a result of damage caused by a stroke. This led



to continued, intense pressure over time, resulting in a stage-IV wound on the thumb that extended to expose the bone. The damage to the hand was extensive and the multidisciplinary team

was unable to open the hand to release any of the pressure. The wound was constantly under pressure and, therefore, became chronic. Given the intensity and consistency of pressure, there was no opportunity for the wound to heal. This led to infection, a risk of complications such as osteomyelitis and an inability of the nurse to keep dressings on the wound. The length of time the wound existed had resulted in an intense odour and complete lack of mobility, as well as an extreme degree of constant pain. Amputation was thought to be the only intervention that would relieve the pain, reduce complications and eliminate a wound that would not heal.

As the Clinical Nurse Specialist for eight long-term care facilities and a Nurse Educator throughout the Province of Ontario, the author has noted an increasing frequency of cases such as this: severe contractures

rendering the hands of elderly patients virtually immovable. Further, the traditional evidence-based methods utilized for local wound care simply were ineffective in providing any significant long-term treatment or relief. It is essential that innovative methods be created to manage these pressure wounds in this population of patients with contractures.

Protocols based on the best practice recommendations by the Canadian Association of Wound Care<sup>1</sup> have been implemented in the eight long-term care facilities at which the author practises. As a result, there is a consistent high standard of care available to patients. The basic premise of the recommendations is to encourage the delivery of a comprehensive, holistic program to all patients with wounds: "treat the wound, treat the patient and treat the cause" is the phrase that most succinctly captures the overall philosophy. The application of these recommendations to treat wounds related to severe hand contractures would require first removing the contracture – the root cause of the



Patient's wound on thumb: note exposed bone.

wound. The application of a splint would assist in maintaining an open hand and removing the pressure. This would prevent a recurrence of the wound, remove the etiology and ultimately prevent amputation.

It is documented that *botulinum* toxin type A (BTX-A, commonly known as Botox) has been utilized in treating children with cerebral palsy, as well as in other medically useful purposes beyond the cosmetic

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Patient's hand wound in the remodeling phase of healing: note increased range of motion.



applications that have received recent media attention<sup>2</sup>. Injections of BTX-A have been used as a safe and effective treatment for a variety of movement disorders, including muscle over-activity and spasticity. When injected into a muscle, *Clostridium botulinum* toxin type A (BTX-A) produces a local, temporary paralysis associated with a decrease in spasticity. *Botulinum* toxin has been used to treat many neuromuscular conditions including adult strabismus, local dystonias, muscle spasms such as blepharospasm (spasmodic eye closure), hemifacial spasm, spasmodic oricolls and laryngeal dystonia<sup>3</sup>.

The electrochemical communication between the muscles and brain results in muscle contraction and movement. This communication is transmitted from a nerve to the muscle by the neurotransmitter acetylcholine. Acetylcholine, when released in too large amounts, will produce an overactive response in the muscles. This overactive response induces the muscle to respond with spasm and then to tense. Botox, when injected into the muscle, will block the nerve from releasing acetylcholine. The outcome is relaxation of the spasm and symptomatic relief to the patient<sup>4</sup>.

The biological effects of BTX-A are well understood. The injection of BTX-A into the muscle creates a localized muscle paralysis caused by the specific binding to presynaptic nerve terminals. When the toxin has

infiltrated into the nerve terminals it inhibits the release of acetylcholine at the neuromuscular junction. When the axon terminal sprouts new nerve endings and forms new synaptic contact with the adjacent muscle, the neurotransmission is recovered<sup>5</sup>. The toxin effect begins within a period from 12 hours to seven days following treatment, and the duration lasts from three to four months in most cases. The duration has been reported to vary slightly longer or shorter, however, with effects lasting up to six months post injection<sup>6</sup>.

The contracture suffered by the patient introduced above was the result of a stroke. In patients afflicted with strokes, doses of 50-300 U of BTX-A have been injected into elbow and wrist flexors with significant improvement as a result<sup>7</sup>. The abductor pollicis brevis and adductor pollicis were palpated and injected with 50 units of BTX-A, utilizing a 27-gauge needle. This

resulted in the muscles becoming paralyzed. The range of motion of the thumb and fingers was increased and the hand became unclenched gradually. Eventually, the hand could be opened to a limited degree, at which point a splinting procedure, involving successive applications of splints, was required in order to ease the hand open and gradually stretch out the contracted muscles. This procedure was also used to implement proper anatomical limb position to improve comfort and to reduce spasticity. This, in turn, would allow the hand to

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## References

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remain open, thereby removing the etiology of the wound and resulting in local wound treatment (application of a silver calcium alginate and foam dressing) and a healing wound. Once the etiology was removed, bacterial burden reduced and moist wound healing implemented, the wound healed promptly and closed completely within 3.5 weeks.

Pre- and post-splint checks were implemented by nursing staff to ensure the safety of the patient. These splint checks included assessment of limb function, pulses, capillary refill, temperature and sensation. This graduated splinting procedure was repeated as the hand gradually continued to open and the range of motion was increased. Overall, the procedure was not only cost-effective but involved straightforward steps that could be mastered easily by nursing staff and implemented in a timely manner.

### Outcomes

In this clinical experience, as of press time, this patient has not yet received a second Botox injection. The initial treatment, however, combined with the graduated splinting has allowed the hand to be opened gradually and, at the present time, she does have a full range of motion with her thumb. This procedure was of critical importance for this patient in this clinical experience. It has left the patient

with a significant amount of relief from pain and discomfort. The wound no longer exists and the hand is no longer in a clenched, tight fist plagued with intense pressure. The procedure can be credited with saving a hand that, eventually, may have had to be amputated.

When monitoring outcome specifics, this splinting procedure proved to be cost-effective by reducing nursing time and the number of dressings. There was an immediate improvement in quality of life, including pain reduction, wound closure and the prevention of complications such as infection, sepsis and amputation. The ease of application of the splinting in the absence of pain has proven to be a treatment option to accelerate the rate of wound healing and improve range of motion in patients with contractures in long-term-care facilities. The ease of the application and cost effectiveness has made this an innovative, attractive nursing intervention/option for the treatment of contractures in long-term-care facilities. The addition of this innovation, in turn, will contribute to the comprehensive, holistic treatment of wounds, which not only results in a positive impact on healing but also decreases the frequency of transfers to hospitals and the subsequent length of stays related to wound management/amputations. The injection of BTX-A in collaboration with the splinting system became an immediate and necessary component in the wound closure and pain reduction. ☺

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## Response to the Use of Botox in Wound Management

BY Lincoln D'Souza

Several plastic surgeons at McGill University Health Centre in Montreal have successfully used *botulinum* toxin type A (BTX-A/ Botox) in the treatment of contractures such as the one described by Hurd. Other uses have included treatment of contractures related to severe burns, and scarring post-reattachment of fingers or toes.

Temporary paralysis is the effect of the toxin. The site of administration as well as the quantity of the toxin determines the duration of the effect. Keep in mind that whether the reduction in muscle spasticity is long or short term, the use of intensive occupational and physiotherapy to stretch shortened connective tissues and improve active range of motion is key in attaining and sustaining muscle strength, joint flexibility and voluntary control of joint movements.

A neurologist runs a specialty clinic at Montreal Neurological Hospital exclusively for the treatment of untoward side effects of neuromuscular disorders, such as muscular dystrophy. The clinic has been successful in helping many overcome the discomfort and limitations imposed by debilitating contractures.

Reimbursement remains an issue at this time, but progress is being made through the use of the Quebec Medication Insurance Plan.