

17th Kinesio Taping Academic clinical Symposium – March 2 & 3, 2002

Biography

Audrey Yasukawa, MOT, OTR

Birthplace: Chicago, Illinois

School: Western Michigan University, Kalamazoo, Michigan

Master of Occupational Therapy

Employment: Rehabilitation Institute of Chicago

345 E. Superior, Chicago, Illinois 60611

Pediatric Occupational Therapist

Teaching experience: I have given numerous workshops and lectures throughout the United States on upper extremity casting. My most recent publication is “Casting protocols for the upper and lower extremities”. I have been researching techniques on the use of Kinesio taping as an adjunct post Botulinum-toxin type A (Botox) injection with casting and also as a follow-up after casting.

Presentation

Title: Management of Abnormal Tone of the Upper Extremity in Children and Young Adults

In today's practice, therapist must intervene with the most appropriate intervention for children and young adults with abnormal muscle activity. This presentation will give an overview of the rationale for treating tonal dysfunction with the long-term goal of improving functional performance. Newer intervention strategies that address these problems, including casting, botulinum-toxin type A (Botox), and the use of Kinesio taping will be incorporated into the program. The sequence or protocol of the use of Kinesio taping, as an adjunct to therapy will be discussed.

Introduction

Spasticity, muscle tightness and restricted joint mobility are common problems found in children with cerebral palsy and similar neurological conditions. Spasticity varies from one individual to another with cerebral palsy and is also different for an individual with traumatic brain injury. The misalignment of the joints and abnormal tone affect the quality and fine motor control needed for upper extremity and hand function.

The use of botulinum toxin type A (BtA) in upper-limb spasticity has been reported as a safe and effective way to manage spasticity. Botulinum toxin- type A is commonly referred to by its trade name Botox®. It is a therapeutic muscle-relaxing drug used to treat spasticity. It is given by injecting a needle into the muscle. Botulinum neurotoxins are produced by certain strains of Clostridium bacteria. There are 7 serotypes, A through G. All serotoxins cause severe food poisoning. Serotype A is known under the trade name Botox.

In 1989 the Allergan Company acquired the rights to commercialize botulinum toxin type A under the trade name Botox®. Allergan received approval from the FDA to market in the USA. It is now approved for use in 59 countries worldwide.

The botulinum toxin exerts its effect at the neuromuscular junction by inhibiting release of acetylcholine, causing a muscle weakness or paralysis and the muscle receive no further stimulation. The benefits include the following: decreased muscle tone and spasm, decreased associated pain and improved function. Within three to ten days, the injected muscles become weak, with a decrease in spasticity reaching maximum effect within a month. The benefits of BtA as a treatment generally last 5-6 months with a gradual increase in tone.

Botox is injected to larger muscles of the arm such as the biceps or brachioradialis by surface landmarks and palpation. An EMG machine is used to identify the smaller muscles of the hand and forearm.

The common problems of the upper limb include the following:

- a. Adducted / internally rotated shoulder
- b. Flexed elbow
- c. Pronated forearm
- d. Flexed wrist
- e. Thumb-in-palm
- f. Clenched fist
- g. Intrinsic spasticity

The role of the occupational therapist in conjunction with the physician:

- a. Patient selection (identifying muscle groups)
- b. Assessing baseline status
- c. Assisting with goals
- d. Providing OT treatment
- e. Follow-up/outcomes (may suggest additional sites for future injections)
- f. Assessing changes from baseline status in follow-up

Post Botox Treatment

The use of BtA, casting and kinesiotaping with occupational therapy may assist with increasing both the muscle length and improving the active balance of the agonist and antagonist. The use of casting and kinesiotaping may provide joint stability with subsequent improvement of voluntary control and coordination in conjunction with an active occupational therapy program. Treatment goals include a reduction of tone, functional motor improvement, improved hygiene, improved positioning, improved passive or active range of motion, and increased tolerance for splints.

1. Casting
 - a. Provide a gentle stretch and length to the shortened muscles during the period of reduced abnormal tone

2. Strengthening program
 - a. Determine where the muscle imbalance lies around the various joints. Balance the forces around the joint. Example: active triceps will effectively elongate the shortened biceps.
3. Kinesio taping
 - a. To improve muscle contraction in weakened muscles, increase range of motion, relieve pain and adjust misalignment

Case Studies

- a. 26-year-old female with athetoid cerebral palsy and a painful right wrist. She demonstrated limited range of motion. She was unable to tolerate range past 40° flexion without complaining of severe pain. **BtA** injection to flexor carpi ulnaris, flexor carpi radialis, flexor pollicis longus, adductor pollicis. **Cast** used: wrist cast. **Kinesio tape** following casting for painful wrist and to assist wrist extension
- b. 18-month-old girl with cerebral palsy and thumb-in-palm deformity. The child was unable to use her thumb functionally to assist during prehension. **BtA** injection to flexor pollicis longus and thumb adductor. **Cast** used: wrist cast with thumb enclosed. **Kinesio tape** following casting for thumb extension and abduction.
- c. 12-year-old girl with cerebral palsy, left hemiplegia. She demonstrated spasticity of the forearm pronators and elbow flexors. She was unable to rotate her forearm into supination for reaching and exhibited difficulty with fine motor control. **BtA** injection to pronators teres, pronators quadratus, brachioradialis. **Cast used**: long arm cast to incorporate the forearm and wrist. **Kinesio tape** following casting for external rotation, supination, and thumb extension.
- d. 11-year-old boy with cerebral palsy, left hemiplegia. He presented with severe dystonia and no functional use of his left arm. He was unable to actively extend his elbow. **BtA** injection to biceps, brachioradialis, pronators teres, flexor carpi radialis/ulnaris. **Cast used**: long arm cast initially followed by a wrist cast. **Kinesio tape** during long arm casting for scapula support, shoulder alignment and relaxing the left upper trapezius. **Kinesio tape** during and following wrist casting for relaxing upper trapezius, scapula support, trunk extension, abdominal facilitation and supination.

Summary

The use of Kinesio taping has assisted with maximizing therapies following Botox injection. Careful patient selection and assessment can promote functional benefits. Kinesio taping has been a useful adjunct for treatment of the pediatric population. Continued experience and creativity can guide us in developing new techniques for taping as well as refining candidate selection and more accurately predicting goals.