

Lending an Extra Hand

TAPING AS AN ADJUNCT TO NDT TREATMENT

By Monica Diamond, MS, PT

Taping is one of the adjuncts that can be used effectively to enhance Neuro-Developmental Treatment in addressing impairments in several systems. The principles of taping are similar for adults and children, although the types of posture and movement problems being addressed may be different.

Both kinesiotaping (elastic) and athletic (non-elastic) taping can improve range of motion, provide proprioceptive input, correct

joint alignment problems, support weak muscles, and directly or indirectly reduce pain. The use of non-elastic tape provides firm, specific control that is very apparent to the patient, “demanding” a position more than “suggesting” it. Elastic taping provides a more subtle input—benefits are obtained from the effect of the direction of rebound of the tape and the ability of the tape to enhance separation of superficial layers of skin from deeper tissue layers (Kase 1998; Schuster 2001; Perrin 1995). Elastic taping can assist with edema reduction and reduction of compression between skin and muscle.

Questions to consider in deciding whether an individual’s impaired movement could effectively be facilitated by using taping include:

- How can I best provide input to change this individual’s movement patterns?
- How can I maximize carryover of therapy activities once the patient leaves the therapy session?
- How can I effectively control multiple problems with only two hands?



Left: Initial position of ankle and foot in patient who has received a double upright AFO with T-strap to control ankle post-CVA eight years ago. Taping will be used for realignment, reeducation, and further assessment to help determine whether a custom molded dynamic AFO will help to improve her weight-bearing, standing, and ambulation. **Center:** Pre-wrap applied in directions thought to be most significant in improving alignment with this patient. Additional pre-wrap can be applied if other directions of “tape pulls” are determined to be necessary during the taping process. **Right:** Ankle and foot position partially corrected with tape.

- What are the activities and situations in which I do not have enough hands to manage all the components that need to be controlled?
- Which components of movement need to be controlled, but need to be generally stable and have less frequent need for ongoing modification and dynamic adjustment?
- What component would allow the patient optimal carryover following treatment if I could follow the patient home and continue to facilitate just one thing?

ENHANCING NDT TREATMENT USING TAPING

As an adjunct to NDT, taping might be used to:

- Provide alignment of body parts so that the therapist’s hands can more effectively address other aspects of the patient’s posture and movement
- Provide additional, specific sensory input to enhance the individual’s

performance

- Maintain desired/effective input for a period of time beyond the scope of the therapy session
- Assess effectiveness of a temporary change in alignment (provided by the tape) as a part of the process for making decisions about orthotics and equipment.

When considering taping as an adjunct, here are some relevant questions:

- 1. What is the goal of taping?** The goal depends upon the treatment plan. For example, for an inpatient undergoing intensive rehab, the goal may be to use taping to assist in determining whether controlling the ankle and foot alignment makes a significant change in the individual’s gait (during assessment for an AFO). A patient with excessive scapula instability may benefit from assistance provided to proximal shoulder girdle alignment so that the therapist can address trunk and distal upper ex-

tremity issues through direct handling. Kinesiotaping might be used for an edematous hand, combined with movement re-education to promote proximal re-alignment and restoration of



Completed position following taping. Rotational forces are applied to prevent ankle inversion, foot supination, and tibial external rotation. Ankle dorsiflexion is also assisted.

optimal lengths and alignment of involved muscles and other tissues. Taping of the knee may be used to provide sensory feedback to the stance pattern of the lower extremity to improve activation of appropriate muscle groups and minimize knee hyperextension in stance.

2. How will the patient be weaned from the use of tape, or what other device or adjunct will be used in its place?

In the above example of assessment for an AFO, the use of taping is temporary until the equipment is obtained. In the above case of assistance to the shoulder girdle, taping may be unnecessary once the patient gains adequate activation of the pelvic girdle and trunk in sitting and can begin to incorporate self-initiated activation of shoulder girdle muscles into activities and functional tasks.

3. Do the benefits of taping warrant its use?

Application of tape uses valuable treatment time, leaving less time for direct treatment. Look at the “big

picture” of the patient’s functional abilities and limitations and his or her underlying impairments. The time may be justified in the following cases:

a) Length of benefit: Once optimal application of the tape is determined, the patient may be more functional for a number of days after application

b) Limited treatment time. The patient or family members may become involved in applying the tape thereby reducing taping time during treatment.

c) Improvement in multiple functional activities. Sometimes the patient needs specific input to correct one poorly aligned musculoskeletal component, but taping will result in other benefits. Take the case of an individual with hemiplegia who has a poorly aligned shoulder girdle positioned in abduction and downward rotation of the scapula combined with thoracic flexion. When the patient attempts to walk, the heavy shoulder girdle falls or is pulled forward by the weight of the heavy arm, possibly combined with an active pull of the pectoral muscles. The therapist determines via handling that gait efficiency, balance control, and endurance all improve when she supports and realigns the shoulder girdle. Taping of the shoulder girdle components in this situation might enhance the individual’s gait speed and balance, might decrease existing shoulder pain, and might provide improved postural alignment and activation so that the patient could push open a door with his partially functioning involved upper extremity while walking.

4. What are the risks that must be considered in deciding whether or not to use taping?

Individuals allergic to tape or adhesives are obviously not good candidates. The reliability and ability of the patient and/or caregiver to apply or remove the tape on their own, if necessary, must be taken into account. Problem-solving ability and

judgment should also be considered—can the individual make appropriate decisions regarding removing or adjusting the tape if it is not effective (e.g. making it slightly less restrictive, changing the angle of pull to be more effective on subsequent tape applications, etc).

Other considerations include sensory deficits that might limit the individual’s awareness of tape that is too tight or causing other problems, balance or safety problems that might occur from the change in movement patterns produced by the tape, and changes in areas adjacent to the tape. For example, taping the scapula to produce improved alignment of the shoulder girdle may initially appear to be very effective, but later may cause problems or pain at the glenohumeral joint due to repositioning of the scapula without maintaining proper alignment of the humerus in relation to the scapula. This could result in the humerus being pulled away from the stabilized scapula by the continued overactivity of the pectoralis major and other muscles.

APPLICATION OF TAPE

Since taping is used as an adjunct and the therapist using NDT has already used handling as a part of both assessment and treatment, determining the location of the tape is fairly straightforward, based on the components to be facilitated or controlled. Tape is applied based on a specific hypothesis about the individual’s motor control and is adapted to control the specific aspects of the individual’s alignment and movement that are most problematic. While the tape is being used, the therapist actively assesses the accuracy of the hypothesis and plans for follow-up.

NDT problem solving in combination with handling will determine how tightly to pull, exactly which movement components to control, the precise angles of pull of the tape, the number of components to attempt to control, the number of pieces of tape to be used to provide the control, and the most effective sequence of application, etc. Expertise increases with practice.

In taping for musculoskeletal alignment, often the strongest or most problematic components are taped first. The therapist is then able to re-evaluate and determine the next most problematic component and apply tape to correct it. Subsequent taping sessions are often shorter and require less tape as the therapist learns to more effectively control the desired positions and movements.

One of the most difficult judgments is deciding how much input to provide and when to stop. Mild correction can be used to assess the effectiveness of changing the individual's posture and movement patterns and to assess the individual's tolerance of the tape and position. Subsequent applications can then be more aggressive.

WHICH TYPE OF TAPE, HOW AND WHEN?

The properties of the tape are matched to the goal of therapy, which may be light intermittent touch, firm control and alignment, sensory awareness, etc. as appropriate for the individual at that time. Many systems can be affected by the tape (musculoskeletal, sensory, perceptual, neuromotor, etc.) and the need to affect each system will play a part in the decision making. A patient who needs sensory information to assist with changing the timing of movement components may do well with elastic taping, but a patient with a very strongly favored movement component may require non-elastic taping, at least at first, to limit activation of this component and to lengthen tight structures.

Established protocols for applying tape (e.g. correction of ankle inversion, knee hyperextension) are useful as starting points and can then be modified based on knowledge of the atypical and limited patterns of posture and movement demonstrated by the patient. It's important to remember that the patient's atypical movements are not isolated patterns to be corrected, but are portions of "movement synergies" that the patient has "selected" from his or her limited repertoire, in order to best solve the movement challenge being faced. Often input in several areas is necessary to discourage the individual's preferred

synergy and provide the opportunity for selection of another option. (Howle 2003)

ADVANTAGES OF TAPING

Taping can be an extremely effective addition to the therapist's "bag of tricks." When used within the clinical decision-making process, it provides the following advantages:

- It can be applied with precision, often making it a more effective option for controlling rotational movement components or very subtle aspects of posture and movement that are difficult to control with standard devices and equipment.
- Taping can be graded almost infinitely to provide the input or control that the patient needs.
- Compared to some other adjuncts, it is flexible, with relatively good cosmesis and unobtrusiveness.
- Once applied, the tape can be worn continuously for a period of several days to provide consistent, sustained input.
- Short-term taping may also provide input for recommending an assistive device or piece of equipment.
- Depending upon the situation, taping can provide the therapist with "extra hands" for optimal facilitation and inhibition, limiting the patient's use of fa-

vored or preferred synergies and optimizing conditions for the patient to explore more effective solutions to his movement problems. ■

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