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?
- 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?

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-
2. How will the patient be weaned 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.

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.

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

**REFERENCES**


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