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In our practice of treating pediatric neurological patients, we often use aqua-therapy as a primary tool of protocol for the various impairments. There are about 60 patients that we treat at the center who range in age from 2 months to 19 years old. After looking at the various aspects in the use of aqua-therapy, the value of using Kinesio Taping® becomes apparent to the practitioner.

There are clearly many benefits one can achieve from using aquatic therapy. One major benefit of using aqua-therapy is that there is no gravitational pull in the water and the pressure remains constant. This in turn increases the milking affect and allows the joint to have a greater range of motion. The chain effect lends itself to the implementation of various exercise techniques and muscular and postural re-training methods. This provides the patient with an excellent medium to work on flexibility and positioning, which is difficult to address with other therapies.

Looking at the benefits of aqua-therapy, it is easy to understand why it is being used more and more in rehabilitation programs. However, there are some negative implications that are often overlooked or missed. One such serious physiological aspect is found in the initial body movement the pediatric patient displays when placed in the water. As the patient enters the water, the patient soon develops an abnormal movement pattern. This occurs from the lack of stabilizing balance and support that gravity normally supplies; the lack of weight bearing properties from the buoyancy of the water; and from the weak and atrophied trunk muscles of the patients. By not recognizing this, the patient can continue the abnormal movements, and in many cases the abnormal pattern can actually get worse with continued treatments. This happens when one does not concern the background theory involved with the treatment of aquatic therapy.

Other implications are brought to our attention when the patient returns for the next treatment. This is caused many times because we do not conduct our daily life in water. Therefore, the many hours of rehabilitation and improvement using aqua-therapy can be lost when the patient is returned to normal atmospheric living conditions of gravity, which allows the postural and abnormal patterns to return. This makes it extremely difficult to determine and reach new stages of therapy. Lastly, another simple but valid complication is that if the youth is sick from anything from a common cold or flu, the aqua-therapy should not be continued.

Whatever methods chosen to train the pediatric patients, most of the time, there will be pain involved with the therapy procedure. In addition, a tremendous amount of effort must also be made from the patient to achieve some level of improvement. Therefore, my main concerns when selecting protocol is to find methods that enable the treatment time to be more effective, to last longer, and/or ease the pain of my patients during their rehabilitative treatment.

In my quest to provide a more patient friendly treatment, I discovered the benefits of Kinesio Taping®. During my clinical treatments, I have observed that the taping method assists the pediatric patient with muscle imbalance resulting from neurological conditions. It does this by stimulating weak muscles and relaxing overused muscles. The tape can also be used for correctional techniques, which involve positional, postural, and joint function taping procedures. An unexpected but much appreciated consideration was the pain relief reported by the patients when the tape was applied. The ability of the technique along with the special tape properties [i.e., light weight, heat sensitive adhesive, and water resistant] provide a longer sustaining efficacy of treatment, which is accomplished because the tape can be worn for several days per application. All of these factors contributed to Kinesio Taping® being added as an adjunct for our aqua-therapy program.

In the following pages, I will discuss and share some of my neurological patient case findings, which will demonstrate the success that can be achieved when using Kinesio Taping® as an adjunct for aqua-therapy protocols.

(A-1) The first patient is a 10-year-old female (A-1). She has severe scoliosis and an unstable neck requiring a nurse 24

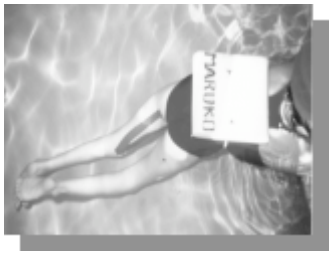
internal rotation, which plantar flexes the ankle and foot.

(A-2) Here, we applied Kinesio® Tape on the left quadratus lumborum muscle, a correctional piece over the right erector spinae muscle from the center to the lateral side, and just above the lump of the scoliosis. Also, we applied a straight piece of tape over the middle area of the scoliosis to the right side of the trunk (A-2). As a result, the hyper lordosis has decreased and the pull causing the hip joint to adduct and internal rotate has diminished. The hyper flexion and abduction that was noticed in the right hip joint is now neutralized and now a more symmetrical movement is being noticed.

I would like to briefly explain the aqua-therapy procedure that I went through with all of my patients. I first tried having the patient be in the most normal posture they we able to maintain. Then, by applying movement during their aqua-therapy treatment, we tried improving the patients' motor ability through training and teaching them the correct movements for improvement. As we noticed improvement in the patients, we would step up the rehabilitation procedure for the next stage.

(B-1) The patient pictured here, is an 11-year-old female. She has a severe neurological dysfunction and she receives 24 hour per day nursing. This patient has no stabilization for the neck. Since the center of balance is different from land and in water, she is wearing a device to help maintain her center of balance in the water. Usually when a beginner first starts swimming, their legs start to sink because the center of balance

changes in the water and it is very difficult for them to adjust. By forcing someone to swim that cannot properly adjust in the water, you can cause them to have back pain. For this patient, both hip joints are adducting with internal rotation caused by myotonia asthenia. Also, there is a subluxation of the left hip joint. On the left side, an extreme amount of pressure is placed on the medial collateral ligament because of the torsion of the lower extremity caused by adduction and internal rotation of the hip joint. Resulting from the unstable feeling of the knee, the calf over contracts and was often seen sticking upwards.

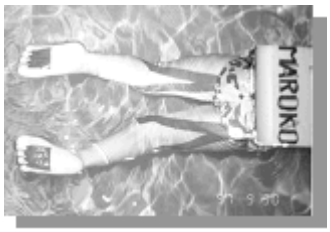


(B-2) In the case of a light subluxation, placing Kinesio® Tape on the Tensor Fascia Latae has been observed to be very effective. However, for a more critical case as with this patient, by placing Kinesio® Tape on the sartorius, semitendinosus, and the pes asterine so that the end of the tape overlaps at the medial collateral ligament, a more significant amount of support to the medial side of the knee joint was achieved (B-2). As a result, it allowed the pelvis to

trunk muscles to do the kicking movements in the water.

(C-1) Patient is a 5-year-old male. This patient is able to create movements on his own, but in order to move forward in the water he has to get on both hands and knees and push upwards at the same time making a jumping type of movement.

Hyperextension caused by the pelvic and body regressions resulted in the patient having an asymmetric pelvic position. To maintain an efficient aqua therapy treatment, we need to train the patient to eliminate this jumping motion in the water. The reason this patient makes a jumping movement is so that his body doesn't shift laterally. Additionally, because his hamstrings are so contracted, when he attempts to stand, his foot drops. Due to his condition, he is not able to stabilize himself and keep his body weight on the soles of his feet. The first way we applied Kinesio® tape for this patient was by applying the same technique for both sides of his hamstrings. As a result, it created the same extension pattern on both legs, which caused the same asymmetric position to occur for the pelvis. As a result of his left leg having a greater dysfunction, we applied the tape from the origin to the insertion for his right hamstring and insertion to origin for his left hamstring. We then added a fan technique to both soles of his feet to create more stabilization (C-2).



(C-2) The extension position of both hamstrings started to equalize. Then by teaching him to do the kicking exercises in the water while maintaining this position, his pelvic position started reducing the asymmetric pattern. By maintaining this posture, it assisted the patient from the gravity imbalance that had him shifting laterally when he was on his hands and knees. This allowed him to move properly without making the

jumping movement seen before.

(D-1) This patient is a 3-year-old female. She has strong scissoring of her lower extremity, and her right hand contorts back toward her buttock. The Kinesio® Tape is applied to the shunt (D-2). A shunt is seen in a large population of pediatric patients with cerebral paralytic. It involves a condition that occurs due to poor circulation of cerebral spinal fluid vessel. This vessel controls the intracranial pressure and fluid flows from the temporal region of the head to the abdominal cavity. The poor circulation causes an increase in intracranial pressure.

(D-2) Because the shunt occurs to the right paralyzed side, it increases the myotonia of the hip joint causing strong adduction and internal rotation. This produces the shoulder joint to hyper-extend posteriorly, and that causes the neck to be asymmetric. In such cases where the shunt occurs to the paralyzed side, even with training, patient progression is rarely seen.

In the water, increased range of motion is normally seen, but for these specific patients, the increase range of motion mostly occurs to the non-paralyzed side, only. Resulting from the associated reaction, hyper-contraction gets stronger to the paralyzed side. If the patient cannot accomplish motor learning skills such as crawling on their hands and knees, there is a possibility it will cause damage to their developmental learning ability. The only way these patients can accomplish that skill is through water exercise.

(D-3) For this patient, as mentioned, the tape was applied from the temporal region of the head over the shunt (D-3). As a result, the scissoring decreased and this allowed the patient's upper extremity to come back to a much more neutralized position.

(E-1) The next patient is a 5-year-old male that suffers noticeably from strong scissoring of the lower extremities (E-1). By applying Kinesio® Tape to his shunt, the scissoring tremendously decreased and his hip joints were able to extend more, allowing his right hand to come to a more neutral position.

(E-2)

(F-1)The last patient I would like to discuss is an 8-year-old female with severe neurological dysfunction (F-1). She is not able to use her trunk muscles at all, her right hip is dislocated, and there is no stabilization of the neck. The pelvis is asymmetric and regression caused by the dislocation of the hip also causes the head to be rotated posteriorly. Her shoulders are elevated which is a sign that her extension and flexion axis are not functioning properly.

(F-2)The pictures show the taping techniques we applied to the rectus abdominus and erector spinae muscles (F-2) & (F-3). In my experience working with Kinesio Taping® and aqua-therapy I have observed these two Kinesio Taping® techniques to be most effective for many cases.

(F-3) Usually when these two taping techniques are applied at the same time an antagonism is noticed. However, since water has no gravity and there is no weight bearing, one of the two taping procedures, apparently the rectus abdominus application for this patient acts in a proprioceptive manner to prevent the antagonism from occurring. By eliminating this, we were able to progress and administer a very effective rehabilitation program for this patient.

For patients with severe dislocation conditions, even by applying assistance from the therapist, it is very difficult to achieve balance of extension and flexion, which leads to asthenia of the abnormal pattern. In such cases, applying aqua-therapy can actually cause the dislocation to worsen. Also, when the patient is supine in the water, treatment is difficult to perform, and the therapist will need to pay more caution to the patients' physical complications.

By applying Kinesio Taping® to both the back and the abdominal muscles the following results were observed. The tape applied to the back acted as a proprioceptive bearing for improved posture, and the abdominal taping appeared to give strength and support the abdominal muscles. This allows for more stabilization of the pelvis and assistance to balance flexion and external rotation of the hip joint

Kinesio Taping® has helped support patients from a static position which enabled them to accomplish a proper motion pattern in the water. Additionally, there are numerous other neuro-muscular patients who have benefited from the use of Kinesio Taping®. We have used it effectively on the abdominals for tractus pyramidorony, and on the back for treating

extrapyramidal dysfunction. Even in patients with an over-contracted psoas muscle, which applies pressure on the iliopsoas, muscles contributing to constipation have gotten relief by taping over the psoas muscle. This application works to decrease pressure off the iliopsoas muscle by relaxing the psoas muscle. Normally constipation is caused by lack of nutrition, fiber, and exercise, but for neurological patients this is not often the case.

A child will develop properly if they have normal motor skill ability. For disabled children with strong central nervous system dysfunction, an abnormal pattern of asthenia develops because the brain sends abnormal signals affecting the motor skills. In patients with moderate or minimal neurological dysfunction, compensatory responses will appear. In these cases, by adding Kinesio Taping® to the aqua-therapy program, and by having the patient master the normal motor patterns over and over, the tape will assist the patient to correct and follow a normal neuromuscular developmental process. The reason Kinesio Taping® seems so effective is that the practitioner is able to approach the patients with a device that treats many of the neuromuscular complications that are an enormous barrier to effective rehabilitation.

Children are constantly in the middle of a continuous growing process, and we therapists should never obstruct this process with a therapy procedure without knowing the background theory of it. This is the same with Kinesio Taping®. Having introduced and explained some of the procedures of protocol that we use for our patients, my hope is that other therapists will find the information useful in treating other children with similar maladies.

It is a pleasure for me to be involved with treating and training children with neurological dysfunctions. In the world of pediatric neurological dysfunction, there are still many struggles to correct the developmental procedure from abnormal pattern asthenia. From our experience and results, we are confident that any type of patient can benefit from this taping method. I will continue to keep using and experimenting with the Kinesio Taping® techniques as an adjunct to my aqua-therapy in order to help as many patients as possible.