

# Muscle Tone

# MUSCLE TONE

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## Definition

Tone is the ability of a muscle to resist a force for a period of time without changing length. It also can be defined as the amount of resistance to passive stretch that is inherent in the muscle, or the muscle's potential for action.

When tone is low, the muscle is relaxed. It will require more active effort before movement occurs than if the muscle is already contracted slightly. If someone else passively moves muscles with low tone, the muscles move easily because they are not contracting to resist the movement. If tone is ideal for activity, the muscles at rest are contracted to a point where joints are held steady in the desired position, yet only slight additional force is needed to cause movement. If tone is abnormally high, the muscle fibers are excessively "biased" so that they are constantly contracted more than is necessary for readiness for movement and, in fact, limit active and passive movement by resisting stretch.

Muscle tone varies among individuals and within individuals at different times and under different conditions. We all have experienced a state of relatively low tone when falling asleep or lying on a warm beach. Our bodies feel limp and heavy in this relaxed state, and we feel as though movement would require a lot of effort. We feel the effects of increased tone at times of extreme alertness, when our bodies are in a state of readiness for action. If someone were to yell "Fire!" right now, we all would experience an immediate increase in muscle tone.

Alterations in tone usually occur in muscle groups or patterns. They can vary depending on the degree of stimulation caused by factors such as emotion, speech, sudden stretch, and effort.

## Abnormal Muscle Tone

A variety of dysfunctions of the nervous system or the muscles themselves can result in muscle tone that is beyond the normal range of variation. Lesions of various areas of the brain, such as those seen in children with cerebral palsy, or brain damage due to traumatic injury or stroke can result in a variety of tone disorders. Many mentally retarded and developmentally delayed children have abnormally low tone, and many of the more profoundly retarded (usually multiply handicapped) children have high tone. Low tone is also a common characteristic of children with learning disorders.

The most common tone disorders are hypotonia (decreased tone), hypertonia (increased tone), and fluctuating tone (tone that changes). Abnormal tone affects stability of parts of the body and the control, speed, and amount of movement which a child can achieve.

If a child has low muscle tone (hypotonia), you can move a body part easily because stretching the muscles meets with little resistance. This child feels “floppy” and is often very flexible (hypermobile) at the joints. This child has difficulty with cocontracting muscles around joints to hold them in position, and so has difficulty maintaining joint stability and controlling movement. Children with low tone may have “pot bellies” due to low abdominal tone; and they may breathe in a shallow manner and have weak lip closure, resulting in an open mouth and drooling. Although it is not always the case, hypotonic children are often inactive and lethargic. Because of difficulty maintaining joint stability, the hypotonic child’s joints can dislocate (slip out of the joint socket) more easily than those of most children. Motor activities should not involve excessive pull on the limbs (for example, pulling up rapidly or swinging around by the hands).

The child with high muscle tone (hypertonia) presents the opposite picture. If you try to move a body part, the muscles resist the stretch and make movement difficult. This child feels stiff or tight and must exert more force to move than a child whose muscles are in a more relaxed state. An extreme degree of muscle tone is described as spasticity and usually results in limited range of movement at the joints due to constant contraction of muscles on both sides of the joints (cocontraction). Children with spasticity are at risk for developing deformities, because abnormal postures are maintained and abnormal movement patterns are repeated. It is important to move these children into a variety of positions throughout the day.

The child with fluctuating tone may be able to move through the full range of motion but can maintain stability only at the extremes (for example, with arms all the way straight out or pulled into flexion). This child may know how to move; but when movement occurs it is disorganized, poorly controlled, and too fast due to lack of stability and unexpected tonal changes. The child with fluctuating tone often has difficulty with eye-hand coordination because of asymmetrical positioning (with head to one side instead of looking forward) and the use of primitive reflexes to straighten the arms for reach. This moves the head (and eyes) away from the arm that is reaching and the hand that is manipulating an object. Children with fluctuating tone often vacillate between extremes of emotion in a similar manner, quickly changing from joyful and happy to extremely upset with crying or screaming.

Many abnormalities of postural tone, such as those due to cerebral palsy, are difficult to categorize into the described tone types. Tone can be mixed (for example, low postural tone with high tone in the extremities) and can vary with stimulation. A child can be hypertonic without having spasticity, and a child with mild or moderate spasticity can vary from normal to high tone depending on the degree of stimulation caused by emotion, speech, sudden stretch, or effort.

Because of the effects of tone on amount and quality of movement, children with abnormal tone are not likely to have the same sensorimotor experiences that most children have and which are thought to be important in developing readiness for academic skills. It is important to encourage these children to engage in a variety of sensory and motor activities.

## Preparation for Motor Activities

Normal movement requires normal postural tone, so prepare the child for any desired motor activity by normalizing tone as much as possible before presenting the activity. Always follow techniques for increasing or decreasing tone with a purposeful activity that requires use of the movement pattern that you are trying to help the child to develop.

In general, children with high tone or spasticity may benefit from activities that relax the parts of the body that are affected, followed by a purposeful activity that requires the desired movement pattern. Provide physical assistance if the child is unable to perform the movement normally, and reduce assistance as skill improves. Provide much repetition of the desired movement (as demonstrated by a therapist) throughout the child's day.

For children with low tone, provide as much controlled sensory stimulation as possible to increase muscle tone (for example, jumping, roughhousing, rubbing, and tapping). Then present a developmentally appropriate movement activity. These children often benefit from activities that require cocontraction of the trunk, neck, and arm muscles and increase stability and control.

Provide activities for the child with fluctuating tone depending on tone. If starting tone is low, activities that involve supporting weight (weight bearing) on well-aligned body parts often helps to facilitate sustained tone for postural control. This is often easier in a sitting or standing position than when the child is lying down. If tone is high, use techniques similar to those used for decreasing tone in a spastic child. During the purposeful motor activity that follows, assist the child in making graded movements that are in the midrange of movement instead of at the extremes (for example, scribbling with the elbow bent, but not all the way). Encourage symmetrical positioning (that is, positioning that is the same on both sides of the body) and eye contact with manipulatives during fine motor activities.

## Compensatory Strategies

Compensation for abnormal tone involves providing external help in the areas that are affected by abnormal tone. These are stability, range of movement, and control of movement. Ways to do this include:

- Positioning the child's body for fine motor work in a manner that maximizes stability and contact with manipulatives.
- Positioning and adapting manipulative materials so they can be reached and controlled.
- Presenting materials in a helpful manner. For a spastic child, slow and calm presentation in a nonstimulating environment can help the child avoid tone increases, while loud and rapid presentation of brightly colored materials might help to alert a hypotonic child and increase tone.

### **Caution**

In-depth treatment of tone and movement disorders should be addressed only by a qualified therapist. The techniques presented here can be useful for preparing a child for a classroom or home motor activity. They are intended to be used in conjunction with a therapy program, and they should be chosen and demonstrated by a therapist before use.

Child's Name \_\_\_\_\_

Date \_\_\_\_\_

## MUSCLE TONE

### Classroom and Individual Practice

# RELAXING THE TRUNK IN PREPARATION FOR ACTIVITY

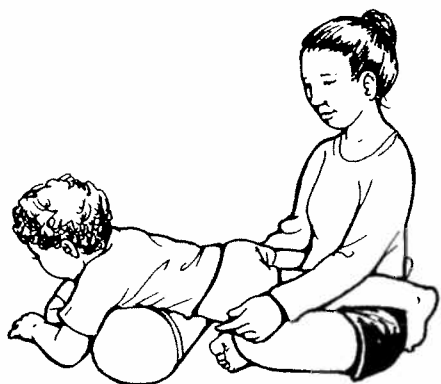
## Purpose

To decrease stiffness in the child's trunk to allow more normal movement patterns for fine motor activity

## Rotation Activities

Any activity that involves slow, rhythmical, passive rotation between the child's shoulders and hips will reduce tone. This can be done in a variety of ways and positions. A few examples are:

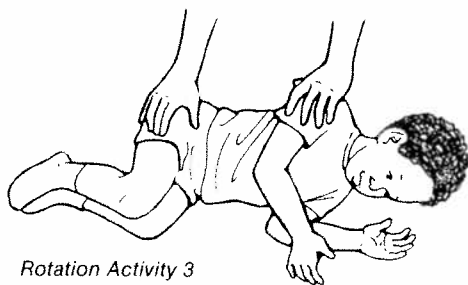
1. Child lies on stomach, with a roll or a bolster under the chest, with arms forward and elbows supported on the floor. Hands are open and palms are facing the floor. Sit behind child. Grasp child's hips. Gently lift one side, then the other, in a slow, rhythmical, alternating movement pattern that results in rotation of the trunk.
2. Seat child on your lap, facing away from you, with hips and knees flexed and back supported against your chest. Use your left arm to hold child's hips still while using your right hand to reach in front of the upper chest and grasp child's left shoulder and back. Rotate child's trunk by pulling the shoulder toward the right side and then back, using firm, slow, rhythmical movements.
3. Child lies on one side on mat or carpet, with neck, knees, and hips bent forward. Sit or kneel behind child. Grasp the upper shoulder with one hand and the hip with the other. Slowly pull the shoulder toward you while pushing the hip forward, then push the shoulder forward and pull hip back to create an alternating movement between the hip and shoulder. Repeat this until relaxation of tone occurs. Turn the child onto the other side and repeat.



Rotation Activity 1



Rotation Activity 2



Rotation Activity 3

## Variations and Adaptations

General body inhibition activities can be combined with rotation activities for further relaxation.

Ways to use relaxing movement, neutral warmth, and sound with rotation:

- Wrap the child in a cotton blanket during rotation activities.
- Child sits in adult's lap (facing away from adult) while adult rocks slowly and regularly in sitting position on the floor, in a rocking chair, or on a swing. Follow by Rotation Activity 2, described above.
- Child swings in a hammock or net swing in curled-up position before sitting on adult's lap and doing an activity that requires trunk rotation.

- Slowly and rhythmically roll the child passively from back to side and back before doing Rotation Activity 3.
- Child lies on stomach over therapy ball while adult provides support at the hips and slowly rocks child back and forth, side to side, or in small circles. Follow with rotation by lifting one hip, then the other, in a firm and rhythmic manner.
- Play slow, regular, relaxing music during any of these activities. Move the child in time with the rhythm.
- During these activities, speak to the child in a steady, slow, monotone voice.
- Reduce the light level in the room before these activities.

Encourage active trunk rotation by placing toys to one side of the child and asking the child to pick them up with both hands or the opposite hand or to play with them in that location. Do not allow child to move the hips to avoid rotation of the trunk.

Incorporate these and other relaxation techniques into games and sing-alongs. Rotation Activity 2 is especially good for this because it is carried out in a sitting position that can be incorporated into group circle activities.

#### **Caution**

Observe child carefully during these activities to monitor effects, and stop when the desired results are achieved. Monitor behavior afterward to ensure that this stimulation is not causing a "rebound" effect of increased tone when the inhibiting activity is discontinued.

If movement is too fast or irregular, these same activities can be stimulating and can increase tone. Be sure you are encouraging slow, regular stimulation and that you are promoting the desired result.

*Use of these activities should be directed by a qualified therapist.*

Child's Name \_\_\_\_\_

Date \_\_\_\_\_

## MUSCLE TONE

### Classroom and Individual Practice

# RELAXING THE ARMS IN PREPARATION FOR ACTIVITY—JOINT APPROXIMATION

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## Purpose

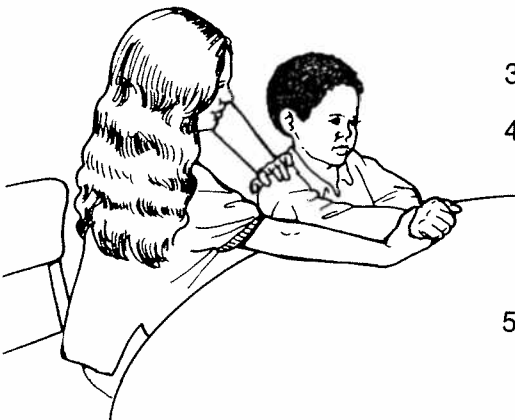
To decrease stiffness in the arms to allow more normal patterns of movement during fine motor activity

## Position

Adult stands or sits behind child, on the side of the arm that is being inhibited.

## Procedure

1. For the right arm, place your left hand behind child's shoulder and your right hand under child's hand, with your fingers against child's palm. Place one finger through the space between child's thumb and index finger to keep them apart.
2. Keep your right arm to the right of and slightly under child's arm, and press slightly against child's elbow with your arm to assist in keeping the elbow straight. Straighten child's arm, and raise it so it is straight out in front of child.
3. With your right hand, turn child's hand so the thumb is on top.
4. Hold the shoulder joint steady with your left hand, and pull gently with your hand, back toward the shoulder, so that the force goes directly through the wrist and elbow and into the shoulder joint. Make sure the joints remain aligned correctly—shoulder down and not moving, elbow straight, wrist straight.
5. Compress the joints in this position for a few seconds; then keep the arm in the same position but stop applying force. Feel whether the arm feels more relaxed; repeat if tone is still high.
6. Repeat on other arm, if needed.
7. Follow with an activity that involves either weight bearing on the arms or simple movements of the arms.



## Desired Response

Tone in the arm is decreased.

## Undesired Responses

Shoulder raises or moves back during compression; joints slip out of alignment (for example, elbow or wrist is bent); child "locks" elbow into extended position.



### **Variations and Adaptations**

Following this activity, encourage child to maintain "all-fours position" and to rock gently back and forth and practice reaching or other arm activities in this position. If child is unable to maintain this position independently, place child over a wedge.

When muscles around the joints relax, increase their range of movement by pressing the arm into the joints slightly and moving a joint in slight back-and-forth or circular movements (for example, moving the entire arm in small circles while pressing gently into the shoulder, or bending the wrist slightly up and down while compressing the arm as described above).

*Use of these activities should be directed by a qualified therapist.*

Child's Name \_\_\_\_\_

Date \_\_\_\_\_

## MUSCLE TONE

### Classroom and Individual Practice

# RELAXING THE SHOULDERS IN PREPARATION FOR ACTIVITY—JOINT APPROXIMATION

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## Purpose

To inhibit stiffness in the shoulders and improve ability to move the arms for reaching

## Position

Adult stands or sits behind child.

## Procedure

1. Place one of your hands on child's shoulder and the other on child's elbow. Press down gently on the shoulder to hold it in a normal position.
2. Raise the child's arm to 35 to 45 degrees, and push gently against the elbow in the direction of the shoulder joint. Hold the shoulder joint steady with your other hand so you are gently pressing the upper arm into the shoulder joint.
3. Slowly oscillate (move the elbow in small back-and-forth movements) or rotate the elbow in small circles while gently pressing the arm into the shoulder joint. Increase the size of the oscillations or rotations gradually as tone decreases.
4. Repeat on the other shoulder, if needed.
5. Follow with an activity that involves functional reach or simple movements of the upper arms.



## Desired Response

Tone in shoulders decreases and range of movement at the shoulder increases.

## Undesired Responses

Tension in the shoulders increases; shoulder moves back or raises up when pressure is applied; or child finds this painful.

## Variations and Adaptations

Encourage child to maintain "prone on elbows position" and rock gently back and forth in this position. If child is unable to maintain this position independently, place child over a wedge.

*Use of these activities should be directed by a qualified therapist.*

Child's Name \_\_\_\_\_

Date \_\_\_\_\_

**MUSCLE TONE**  
**Classroom and Individual Practice**

## **RELAXING RAISED AND RETRACTED SHOULDERS— INHIBITING POSITIONS**

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### **Purpose**

To inhibit muscle tone in shoulders that are raised and pulled back

### **Position**

Child sits in front of adult, facing same direction.



### **Procedure**

1. Place your hands on child's shoulders, with your palms making firm contact with the tops of the shoulders.
2. Press shoulders down and curl them forward so that child's arms are forward.
3. Maintain this support while child uses both hands in front of body to play with a toy. When shoulders feel more relaxed, decrease your support.

### **Desired Response**

Tone in shoulders decreases, and arms and hands can be used together in front of the body.

### **Undesired Response**

Tension in the shoulders increases and the shoulders continue to push against your hands or arms.

### **Variations and Adaptations**

Sit next to child. Put your arm around child's shoulders, round them forward, and press them down. If shoulders are still tense, press gently on the center of the breast bone (sternum).

In a wheelchair, place rolls or rolled-up towels behind shoulders to help maintain them forward during hand use.

Make a cape of cotton material or a large scarf. Fasten it firmly around the child's shoulders to hold them forward.



*Use of these activities should be directed by a qualified therapist.*

Child's Name \_\_\_\_\_

Date \_\_\_\_\_

## MUSCLE TONE

### Classroom and Individual Practice

# RELAXING PROTRACTED SHOULDERS— INHIBITING POSITIONS

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## Purpose

To inhibit muscle tone in shoulders that are held forward with arms held tightly against chest

## Position

Child sits in front of adult, facing away.

## Procedure

1. Place your hands on child's shoulders, with your palms making firm contact with the top of the shoulder.
2. Pull child's shoulders back and down so the upper arms pull away from the chest.
3. Step in front of child and grasp both elbows, with your hands on the outer sides of the arms.
4. Gently pull child's arms up while turning them outward until the hands are positioned with thumbs up.
5. Encourage child to clap hands or touch your face in this position.



## Desired Response

Tone in shoulders decreases, and arms and hands can maintain a neutral position in front of the body (thumbs on top, not palms up or palms down).

## Undesired Response

Tension in the shoulders increases and the shoulders continue to push against your hands. Arms and hands are rotated internally so that thumbs are down.

### **Variations and Adaptations**

Place child on stomach over a large therapy ball. Grasp both shoulders and pull them back toward you while rocking the ball slowly from side to side or back and forth. Pull one shoulder back, then the other, and repeat this while rocking the ball from side to side to create some movement between the shoulders and rotation between the shoulders and hips.

In a wheelchair or at a desk, press the shoulders down and lift the arms up and out (as described above) into the desired position, then place the arms and hands so that they rest on the lap tray or desk in this position. Provide as much physical support as needed to keep the shoulders and arms in this position, and encourage child to engage in fine motor activities in this position.

*Use of these activities should be directed by a qualified therapist.*

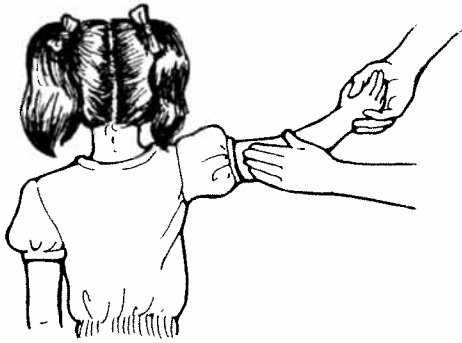
Child's Name \_\_\_\_\_

Date \_\_\_\_\_

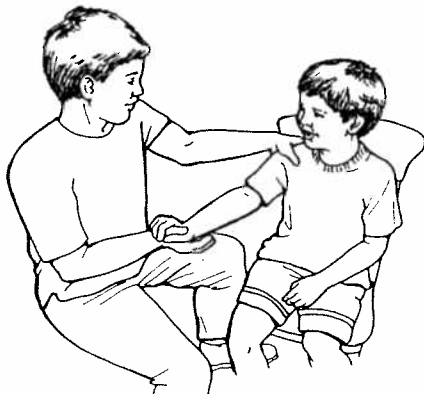
## MUSCLE TONE

### Classroom and Individual Practice

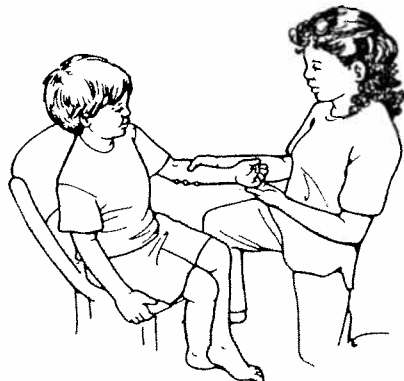
# RELAXING THE ELBOWS IN PREPARATION FOR ACTIVITY



*Straightening elbow*



*Pushing against palm*



*Bending elbow*

### Purpose

To decrease stiffness at the elbow to improve movement patterns for fine motor activity

### Position

Child sits in chair or on floor; adult sits behind or next to child, on the side of the arm that is being prepared for activity.

### Procedure

#### *For straightening elbows*

1. Hold child's hand and push the elbow forward from behind to straighten the arm.
2. Child leans to one side and supports weight on the palm of the hand, with straight arm. Provide physical assistance, if needed, to help child maintain a straight-arm position. Decrease your support whenever possible. Weight can be supported on the floor, against your hand, against the seat of the chair, and so on. Or, push against child's palm while child maintains a straight arm instead of requiring weight bearing.

#### *For bending elbows*

1. Before bending, grasp child's elbow and turn it so that the palm of the hand faces up.
2. Encourage child to touch chest, hair, or face as you bend the elbow.
3. Provide physical support to maintain the arm in a flexed position for fine motor activity. Decrease support, if possible.

### Desired Response

Tone in the arm decreases as the elbow is straightened or bent.

### Undesired Response

When working on straightening arm, arm "locks" into an abnormal stiff position.

### **Variations and Adaptations**

#### *For straightening arm*

Child lies on stomach over roll or bolster; supports weight on straight arms.

#### *For bending arm*

Mount a dowel to a desk, table, or lap tray in a vertical position; child grasps dowel to keep arms bent.

*Use of these activities should be directed by a qualified therapist.*

Child's Name \_\_\_\_\_

Date \_\_\_\_\_

## MUSCLE TONE

### Classroom and Individual Practice

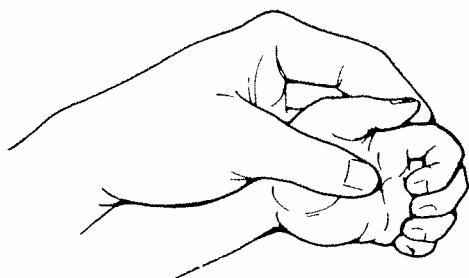
## RELAXING FISTED HANDS IN PREPARATION FOR ACTIVITY

### Purpose

To open hands that are held in a fisted position due to high tone

### Position

Child sits or lies in a symmetrical position.



### Procedure

1. Grasp child's hand with your fingertips on the back surface and your thumb on the fat pad of skin below child's thumb.
2. Press firmly on the area below child's thumb; rotate the hand outward until the palm is facing up.
3. Straighten the wrist; hold child's arm above the wrist with your other hand, maintaining the palms-up positioning.
4. Press the hand gently in the direction of the elbow (so that the wrist joint is being compressed); move child's hand in small, slow circles around the wrist until you feel some relaxation in the wrist and hand. The forearm should not move.
5. Massage the muscles on the back of child's hand firmly with your fingertips, and use your thumb to press outward to gently roll the fingers out from the palm.
6. Follow with purposeful activity that requires weight bearing on hands, grasp, or using open hand (for example, to stabilize paper).



### Desired Response

Child's hand relaxes and opens.

### Undesired Response

Wrist is flexed during compression, or fingers are forcefully stretched open.

### Variations and Adaptations

If stretching fingers open results in increased tone, or if child is unable to open hands fully, provide a contoured surface for weight bearing on hands. The child can grasp a roll, raised grab bar, rolled towel, or cone.

If hands are tightly fisted, place a hard toy, dowel, or cone in child's hand to keep the hands open for extended periods of time. Position cones with the small end on the thumb (radial) side of the hand.



If placing objects or utensils in the hand for grasping, choose objects with a hard surface to inhibit the tone in the flexor muscles.

During coloring activities, provide cone-shaped crayons to relax flexor tone in the hand muscles as the child grasps the crayon.

**Caution**

Never forcefully stretch fingers open.

*Use of these activities should be directed by a qualified therapist.*

Child's Name \_\_\_\_\_

Date \_\_\_\_\_

**MUSCLE TONE**

**Classroom and Individual Practice**

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## **STIMULATING NECK AND TRUNK TONE**

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### **Purpose**

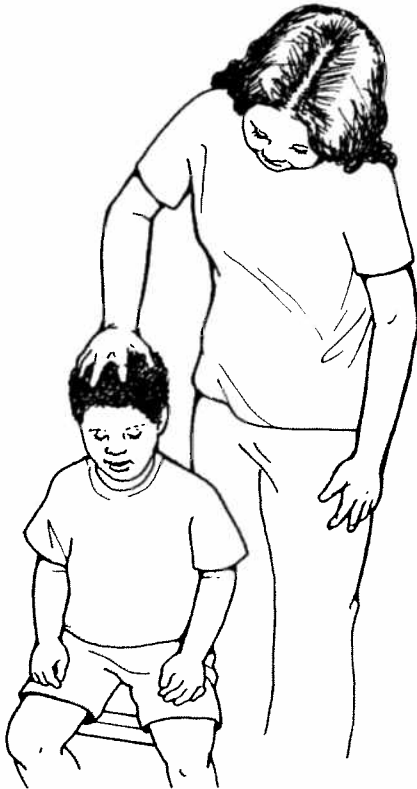
To increase muscle tone so that trunk and neck positions can be maintained with increased stability

### **Preparation**

General stimulation techniques can be useful for increasing level of tone and alertness before beginning activities designed to increase tone in specific parts of the body. Tone can be stimulated through loud and irregular music, bright lights and warm colors in the room, brisk but light touch, speaking rapidly in high or low tones and with excitement in your voice, and rapid movements.

### **Stimulation Techniques**

The techniques described below often increase muscle tone. Follow this temporary increase in tone with an activity that requires maintaining the trunk in a stable position. These techniques are intended to build strength and provide feedback to the child about how the movements feel when the body is more stable.



1. Adult bounces child briskly and with an irregular rhythm, on a large ball, in lap, or on a mini-trampoline or bed. Let an older child jump on a mini-trampoline in the classroom between periods of inactivity or desk work.
2. Allow a brief movement period whenever child is slumping in the chair or on the floor. Have child do rapid movement exercises (jumping jacks or running quickly in place) briefly to increase tone before beginning a fine motor activity. Rapid and irregular swinging in a hammock, or bumping into a soft piece of furniture or another child while lying in a hammock or sitting in a swing, are other stimulating movement activities.
3. When child is not maintaining upright body or neck posture, quickly tap or massage the muscles on either side of the spine (on the neck and back).
4. With child sitting with good posture, place your hand on the top of child's head and press firmly, straight down, so that the force goes straight through the neck, down the spine, and through the hips. If child is unable to maintain a good sitting posture, hold child in your lap facing away from you, and support child's back and neck with your chest while applying pressure. Press firmly for a few seconds; then release. Repeat this until child's tone increases so a more upright posture is maintained.

5. Press down through the shoulders in the manner described above.

**Caution**

Observe child carefully during these activities to monitor effects, and stop when the desired results are achieved.

If movement is too slow or regular, the movement activities can be inhibitory and decrease tone. If child is carrying out stimulating activities independently, be sure movement is fast and irregular and that it is promoting the desired result.

Make sure that joints are aligned properly before applying any pressure through them.

*Use of these activities should be directed by a qualified therapist*

Child's Name \_\_\_\_\_

Date \_\_\_\_\_

## MUSCLE TONE

### Classroom and Individual Practice

# STIMULATING SHOULDER AND ARM TONE— JOINT COMPRESSION

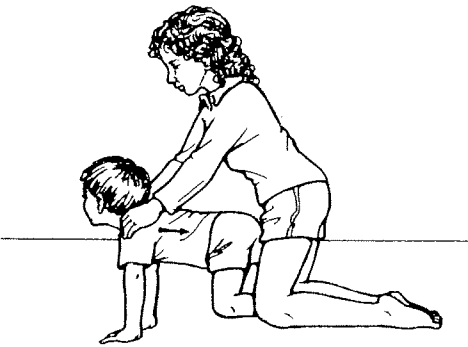
## Purpose

To increase muscle tone and balance in the shoulders and arms

**Preparation** If tone is low, general stimulation techniques can be useful for increasing level of tone before beginning activities designed to increase tone in specific parts of the body. Tone can be stimulated through loud and irregular music, bright lights and warm colors in the room, brisk light touch, speaking rapidly in high or low tones and with excitement in your voice, and rapid movements.

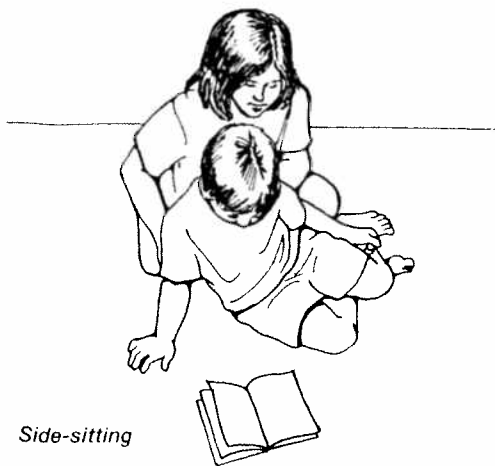
## Joint Compression Techniques

Any activity that provides pressure that is greater than the weight of the body part into a joint (joint compression) will stimulate the muscles around the joint and increase the stability at that joint. Follow this temporary increase in tone with an activity that will use the joint in the stabilized position. These techniques are intended to build strength and provide feedback to the child about how the movements feel when the body is more stable.



*Bouncing for arm support*

1. Prone on elbows. Child lies on stomach and supports weight on elbows that are aligned straight below shoulders. Place your hands on child's shoulders and press down firmly several times. Child carries out activity in this position. Have child do activities that involve forceful grip (such as shooting water pistols) while in this position.
2. Bouncing to facilitate arm support. If child is unable to support body weight on straight arms in "all-fours" position, kneel behind child, place your hands on child's shoulders, have child lean buttocks against you, and bounce child gently against your stomach. Each time child comes forward, try to increase the amount of weight that is supported by the arms.
3. Joint compression in "all-fours" position. With child in crawling position, press straight down on shoulders so that force goes straight through shoulders, elbows, and wrists. Press down firmly several times.
4. Crawling activities. Any activity performed in the "all-fours" position, with shoulders, arms, hips, and knees well aligned, will result in joint compression. Incorporate this position into obstacle courses, relays, and other games.



Side-sitting



Manual compression—lying down



Manual compression—sitting



Arms rotated for weight bearing

5. Side-sitting position. Compression occurs naturally when child sits in side-sitting position, bearing weight on one arm. Provide physical support at the elbow to keep the arm straight and joints aligned. Have child sit in this position while you provide instructions for a fine motor activity; or have child side-sit with both hands on the floor. Encourage child to lean over the arms so that more body weight is supported on straight arms.

6. Manual compression.

*Lying down.* While child is lying on the back, raise the arm straight up, provide physical support to keep the elbow straight, and firmly press the arm down into the shoulder several times.

*Sitting.* Kneel or sit on the floor behind child. Place one hand on child's shoulder or around the child's waist; hold child's hand with your other hand, brace the elbow straight with your arm, and raise child's arm to above shoulder level. Push child's palm toward the shoulder several times; then lower the arm and repeat the pushing. While keeping the elbows straight, repeat this with the arm lower and lower until child's hand is on the floor and child is leaning onto a straight arm.

### Variations and Adaptations

If unable to support body weight on elbows or on straight arms, child lies over a wedge or soft swing while compression is applied to the shoulders.

If child is unable to keep the elbow straight during weight-bearing activities, briskly tap the muscles around the elbow joint.

If child has any spasticity in the shoulder or arms, rotate the arms and hands outward slightly (external rotation) before weight bearing or joint compression.

### Desired Response

Tone around the joints increases so child is able to support weight on arms.

### Undesired Response

Child "locks" elbow into straight position or bears weight on bent elbows.

### Caution

Apply joint compression only when joints are aligned correctly.

*Use of these activities should be directed by a qualified therapist.*

Child's Name \_\_\_\_\_

Date \_\_\_\_\_

**MUSCLE TONE**  
**Compensatory Strategies**

## **POSITIONING AND MATERIALS FOR THE CHILD WITH LOW TONE**

### **Purpose**

To improve fine motor ability by increasing stability and providing materials that are easy to manipulate

### **Suggestions**

#### **Chair Positioning**

The child with low tone lacks stability, or a steady position from which to move. Provide external support to help maintain a secure and stable position for fine motor activity. The ideal position includes:

1. Trunk well supported (not leaning forward or to either side) with head at midline. Make sure that the height of the work surface (desk, lap tray, table) is high enough to support the arms while encouraging upright posture. A "cutout desk" often provides increased support for the trunk by supporting both arms.

A chair with arms can increase stability when the child is seated at a regular classroom desk. Caution: Plastic classroom chairs often have too deep a seat, recline the child slightly, and do not provide a stable position for arm use.

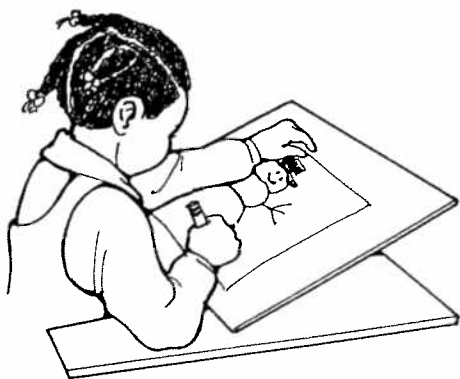
2. Feet firmly supported on a flat surface. If classroom chair is too large and child's legs dangle, attach a small wooden footrest to the chair legs.

3. Arms supported by work surface. A slanted work surface supports the forearms while encouraging a more upright trunk posture. Sometimes a child with low tone can control arm movements better when the work surface is higher than usual so that it provides increased shoulder stability. Try a number of heights of tables to find optimal height. The surface should never be below the level where the elbows would rest on it if held out about 30 degrees from the body.

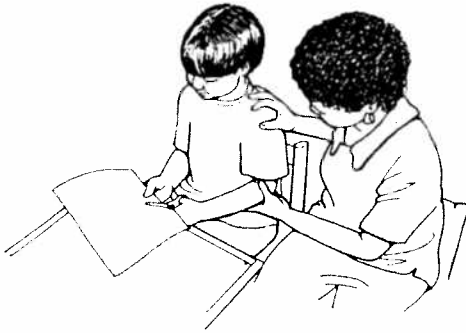
### **Materials**

The child with low tone often avoids movement activities because of the effort required. Think of ways to make materials attractive and easy to manipulate.

1. Provide manipulatives, markers, paints, and other materials that are visually stimulating and attractive. Shiny surfaces and bright, warm colors (reds, yellows, and oranges) are stimulating.



2. Markers move more easily on a writing surface than crayons or pencils.
3. A smooth work surface provides less resistance to movement. Child can slide objects along the surface.
4. Provide light toys and manipulatives that don't look heavy:
  - Foam toys
  - Hollow plastic toys or manipulatives
  - Light wooden toys or manipulatives
  - Cardboard blocks



### **Assistance During Movement**

If arm movements are poorly controlled because the shoulder lacks stability, press down on child's shoulder and support the upper arm to increase stability while child uses the arm to draw, cut, and manipulate objects.

### **Comments**

These suggestions may improve the child's ability to participate in classroom activities independently but will not develop the muscular strength and stability needed for independent maintenance of postures and control of movement. Make sure that this child is encouraged to maintain a variety of postures independently and to manipulate more difficult objects throughout the day.

For the child with very low tone, a number of adaptations may be required for positioning. If the position described above is not being maintained during fine motor activities, consult a therapist or an adaptive equipment specialist.

*Use of these suggestions should be directed by a qualified therapist.*

Child's Name \_\_\_\_\_

Date \_\_\_\_\_

**MUSCLE TONE**  
**Compensatory Strategies**

## **POSITIONING FOR THE CHILD WITH FLUCTUATING TONE**

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### **Purposes**

To increase stability and body symmetry

To decrease involuntary movements through positioning

### **Suggestions**

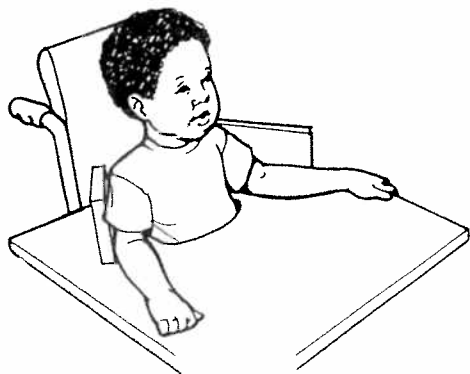
The child with fluctuating tone lacks control of body movements and tends to assume asymmetrical body positions that interfere with movement and eye-hand coordination. Provide external support to help maintain a stable and symmetrical position for fine motor activity.

**Sitting Position.** The ideal sitting position includes these elements:

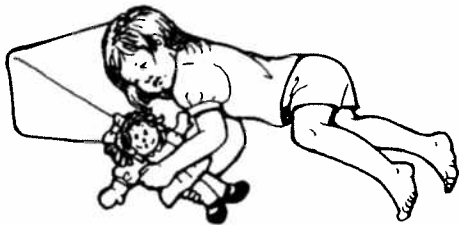
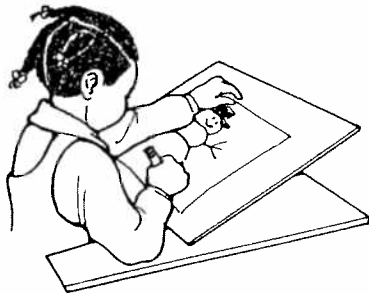
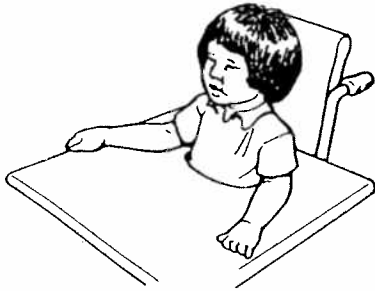
1. Trunk is well supported (not leaning forward or to either side), with pelvis and shoulders positioned symmetrically and hips, knees, and ankles bent about 90 degrees. (If child also has spasticity, the hips may need to be bent more than this.)

A midline bar sometimes helps to maintain a symmetrical posture and control involuntary arm movements. Attach a horizontal dowel to the front edge of the lap board or to a work surface. Child grasps the bar with both hands to stabilize the arms in a symmetrical posture, and then moves from that position. Toys and other materials can be tied to the bar to keep them from falling to the floor.

2. Feet are firmly supported on a flat surface.
3. Both arms are forward in symmetrical position. To support the arms forward:
  - Rest them on the work surface.
  - Mount a dowel to the work surface for the nondominant hand to grasp. (This should be used only for children with mild to moderate tone disorders.)
  - Provide a chair with a triangular angle to the back.
  - Put your arm around child's shoulders, curling the shoulders forward slightly so that the arms stay forward.
  - Provide triangular-shaped foam wedges or a rolled towel behind the shoulders to position them forward.
  - Attach humeral wings to a work surface, chair, or wheelchair to hold the upper arms forward for fine motor activity.







4. Work surface is high enough to stabilize the shoulders. A higher work surface will provide increased shoulder stability. Try a number of heights of tables to find optimal height. For a child with very poor shoulder control, experiment with a work surface that is just below the height of the axilla (underarms), and lower it as the child's control improves. The surface should never be below the level where the elbows would rest on it if held out about 30 degrees from the body.

5. Head is in a position that enables child to see hands and objects on the work surface. Rolls and rolled-up towels sometimes help to keep the head in midline, but often adaptations to the wheelchair are required (such as lateral head supports).

A slanted work surface, such as that provided by a desk easel, supports the forearms, encourages a more upright trunk posture, and places the paper or hands where they can be seen more easily.

**Sidelying.** This is an excellent position for decreasing involuntary movements and using the hands where they can be seen. Position the child so that:

1. Neck is bent (flexed) forward slightly.
2. Hips and knees are bent.
3. Shoulders are forward (protracted) and arms are positioned across the chest.
4. The upper arm and leg are bent more than the lower ones.
5. A firm pillow or wedge supports the head and upper arms.
6. Legs are held apart (abducted) with a rolled-up blanket or pillow, if needed.

Sidelyers that help a child to maintain this position are available commercially.

**Prone Position.** If the child is able to maintain a "propped-on-elbows" position, this stabilizes the shoulders and elbows and decreases random, uncontrolled movements. This is a good position for cutting with scissors or coloring. If child is unable to support body weight in this position, place child over a bolster or wedge to support some of the weight of the trunk. This can be a very tiring position, especially for children with weak head and back control; and it should be used for only short periods of time and gradually increased. The height of the wedge should be such that:

- Shoulders are slightly higher than hips.
- Elbows are directly under shoulders and resting on floor.

### **Comments**

Positioning may improve the child's ability to participate in classroom activities but will not help to develop the stability and midrange control needed for increased control of movement. Make sure that this child is working on upper extremity stability and control of small movements in a therapeutic program.

A number of adaptations may be required to achieve symmetrical positioning for a child with fluctuating tone. If any of the positions described above are not adequately maintained in the child's current positioning arrangement, consult a therapist or adaptive equipment specialist.

*Use of these suggestions should be directed by a qualified therapist.*

Child's Name \_\_\_\_\_

Date \_\_\_\_\_

**MUSCLE TONE**  
**Compensatory Strategies**

**CLASSROOM MATERIALS AND ASSISTANCE FOR  
THE CHILD WITH FLUCTUATING TONE**

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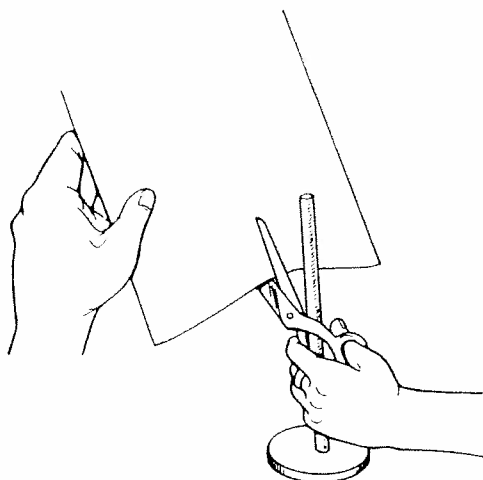
**Purpose**

To improve fine motor abilities through physical assistance and choice of manipulative materials

**Materials**

The child with changing tone lacks stability and control of movement. Think of ways to increase the stability provided by objects and the work surface, to simplify the movements required, and to keep objects within reach.

1. Provide heavier toys, manipulatives, and writing implements:
  - Writing implements with weighted holders
  - Heavy wooden blocks
  - Solid rubber toys
  - Large nuts and bolts
2. Provide writing utensils that provide more resistance against the writing surface, such as grease pencils or crayons rather than markers or ballpoint pens.
3. Writing or drawing may be more controlled when child is on hands and knees or kneeling, because of the added weight of the body over the arms.
4. Provide a nonskid surface for fine motor activities. Dycem® is a rubbery surface that can be placed on the work surface during manipulative activities; or have the child work on a carpet or other textured surface.
5. Provide a wooden or cardboard ridge around the work area to create a "desk fence" to keep objects within reach despite poorly controlled movement.
6. If the child is unable to maintain a grasp because of tone changes, secure the article to the child's hand during use. A number of devices are commercially available or can be easily made to hold articles securely in the hand. (See Grip and Pinch Strength: Compensatory Strategies—Adaptations for Nonfunctional Grip and Pinch.)



7. Encourage the child to slide objects along a work surface if the child is unable to pick them up and move them in a controlled manner. Use magnetic work surfaces with metal manipulatives.
8. If tone changes interfere with stabilization of paper, tape down the paper; or stabilize it with a one-arm writing board for writing activities.
9. To control involuntary movements during cutting activities, have the child grasp an upright dowel attached to a work surface.
10. Encourage use of materials that provide some resistance to movement, such as putty, modeling clay, or cooking dough.

### **Assistance During Movement**

Present activities rhythmically to help the child develop a sense of timing of movement.

Help the child keep the arms forward, stabilize the upper arm, and control movement from the shoulder while using the arm to draw and cut.

### **Comments**

These suggestions may improve the child's ability to participate in classroom activities but will not develop the stability and midrange control needed for increased control of movement. Make sure that this child is working on upper extremity stability and control of small movements in a therapeutic program.



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*Use of these suggestions should be directed by a qualified therapist.*

Child's Name \_\_\_\_\_

Date \_\_\_\_\_

**MUSCLE TONE**  
**Compensatory Strategies**

## **POSITIONING FOR THE CHILD WITH HIGH TONE**

### **Purpose**

To position the hypertonic or spastic child so that tone is decreased and fine motor abilities are maximized



### **Suggestions for Classroom Positioning**

1. Pre-position the child in a symmetrical, flexed position before carrying or placing into a chair or sitting position:

- Bend (flex) the hips and knees.
- Round (protract) the shoulders forward.
- Keep the arms out from the body (abducted) slightly.
- Place the head in midline and bent forward slightly.

A child can be lifted into or from a wheelchair in this position. For an older child, this may require one person on either side. Never lift the child by pulling up under the arms with legs straight; this will increase tone.

2. Change the child's position often to prevent tightening of muscle groups and possible contractures which permanently limit movement. Use a number of positions throughout the day. Possibilities include:

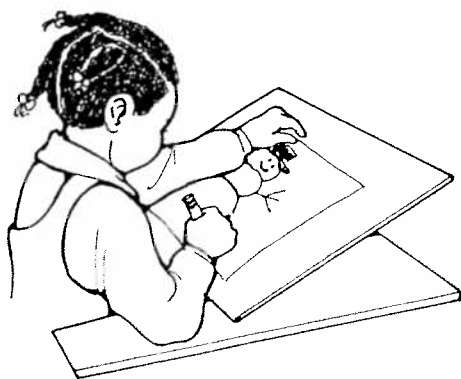
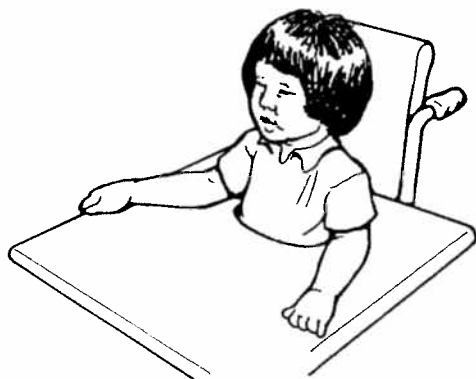
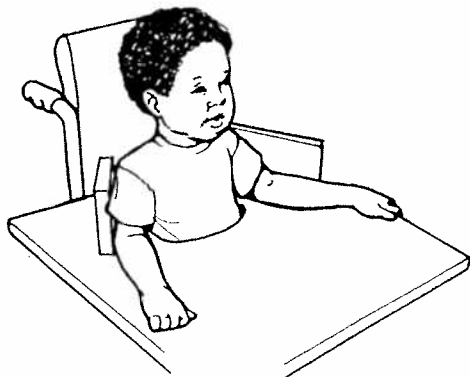
- Sitting in an adult's lap during story or circle time.
- Lying prone over a wedge or bolster.
- Standing in a prone stander at a table for fine motor activity.
- Sidelying for free play or other fine motor activity.
- Sitting in an adapted chair or wheelchair.

### **Position**

The child with high tone tends to maintain a few abnormal postures and moves within small ranges with great effort. Provide external support to help maintain a stable and symmetrical position for fine motor activity, and encourage a number of positions that inhibit tone.

**Sitting Position.** The ideal sitting position includes these elements:

1. Trunk is well supported (not leaning forward or to either side) with pelvis and shoulders positioned symmetrically and hips, knees, and ankles bent at least 90 degrees. (If child has spasticity, more bending at these joints may decrease tone further.) Buttocks are placed as near to the back of the chair as possible.



2. Feet are firmly supported on a flat surface, and knees  $\frac{1}{2}$ " to 3" higher than the hips.

3. Both arms are forward in symmetrical position. To support the arms forward:

- Rest them on the work surface.
- Mount a dowel to the work surface for the nondominant hand to grasp. (Use this only for children with mild to moderate tone disorders.)
- Work in a chair with a triangular angle to the back.
- Put your arm around child's shoulders, curling the shoulders forward slightly so the arms stay forward.
- Provide triangular-shaped foam wedges or a rolled towel behind the shoulders to position them forward.
- Attach scapula wings to the chair to decrease the pulling back of the shoulders.
- Attach humeral wings to a work surface, chair, or wheelchair to hold the upper arms forward for a fine motor activity.

4. Work surface is high enough to stabilize the shoulders. A higher work surface will provide increased shoulder stability. Try a number of heights of tables or trays to find optimal height. For a child with very poor shoulder control, experiment with a work surface that is just below the height of the axilla (underarms), and lower it as the child's control improves. The surface should never be below the level where the elbows would rest on it if held out about 30 degrees from the body.

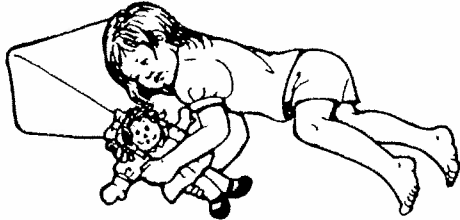
5. Head is upright in line with the back, and facing forward. The chin is parallel to the floor or the neck is bent forward slightly. Rolls and rolled-up towels sometimes help to keep the head in midline, but often adaptations to the wheelchair are required (such as lateral head supports).

Lowering of the head for reading, writing, or other fine motor activity often results in increased flexor tone which results in a "hunched" positioning over the work surface. If the work surface is angled upward, the child can see without bending the neck forward.

A slanted work surface, such as that provided by a desk easel, also supports the forearms and encourages more upright trunk posture.

**Sidelying Position.** This is an excellent position for decreasing extensor tone (which causes the back to arch) and for using the hands where they can be seen. Position the child so that:

1. Neck is bent (flexed) forward slightly.



2. Hips and knees are bent.
3. Shoulders are forward (protracted) and arms are positioned across the chest.
4. The upper arm and leg are bent more than the lower ones.
5. A firm pillow or wedge supports the head and upper arms.
6. Legs are held apart (abducted) with a rolled-up blanket or pillow, if needed.

Sidelyers that help a child to maintain this position are available commercially.



**Prone Position.** Often the child with spasticity is unable to maintain a prone-on-elbows position because of increased flexor tone when lying on the stomach. This makes it impossible for the child to lift the head off the ground without using abnormal movement patterns (neck hyperextension) or to get the arms away from the body to support weight. Some children can maintain the position but are unable to reach out. A properly fitted wedge often enables the child to maintain this position and to use the arms while bearing weight on the elbows. This can be a very tiring position, especially for children with weak head and back control; and it should be used for only short periods of time, then gradually increased. The height of the wedge should be such that:

- Shoulders are slightly higher than hips.
- Elbows are directly under shoulders and resting on floor.

Some children do not have sufficient control to hold up the head when lying on the stomach. These children may need a more upright position, such as that provided by a prone stander.

### Comments

Positioning may improve the child's ability to participate in classroom activities but will not help to develop the skills needed for increased control of posture and movement. Make sure that this child is working on a therapeutic program that addresses these areas.

For the child with high tone, a number of adaptations may be required to achieve symmetrical positioning that inhibits tone. If any of the above positions are not adequately maintained in the child's current seating arrangement, consult a therapist or adaptive equipment specialist.

*Use of these activities should be directed by a qualified therapist.*

Child's Name \_\_\_\_\_

Date \_\_\_\_\_

**MUSCLE TONE**  
**Compensatory Strategies**

## **CLASSROOM MATERIALS AND ASSISTANCE FOR THE CHILD WITH HIGH TONE**

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### **Purpose**

To improve fine motor abilities through physical assistance and choice of manipulative materials

### **Materials**

The child with high tone has too much stability and moves in only small ranges and in a few movement patterns. Think of ways to decrease the resistance to movement that is caused by objects and the work surface, to simplify the movements required, and to place objects where they can be reached.

1. Use manipulatives that are light and don't look heavy:
  - Foam toys
  - Toys and blocks made of hollow plastic, cardboard, or light wood
  - Balloons
2. Work on a smooth surface.
  - Cover the table surface with powder or cornstarch.
  - Let the child move objects from one place to another by sliding them on a surface.
  - Let the child paint or draw in shaving cream or finger paint on a table surface.
3. Place objects so they are near the hands.
4. Adapt activities so they require only simple movements.
  - For painting, tape stencils over paper; let child paint over the stencil with simple arm movements.
  - Affix flexible-loop scissors to a block of wood so that simple pushing movements will result in cutting.
  - Use adapted grippers to hold utensils.



### **Assistance During Movement**

1. Present activities slowly and rhythmically to avoid tone increases due to surprise.
2. Help child keep the arms forward and out from the body by holding the shoulder and elbow and assisting movement at the upper arm during fine motor activities.



### Comments

These suggestions may improve the child's ability to participate in classroom activities but will not develop the range of movement and variety of movement patterns needed for increased control of movement. Make sure that this child is working on these areas in a therapeutic program.

*Use of these suggestions should be directed by a qualified therapist.*

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