

Arm Strength

ARM STRENGTH

Development

Strength of the arm muscles increases steadily throughout infancy and childhood. As children move their bodies by crawling, pulling with the arms, swinging, and climbing, they strengthen the muscles of their shoulders, arms, and hands. Early play involves lots of pushing and pulling of objects, large arm movements, manipulation of toys, and other activities that strengthen the arm muscles. As strength and coordination increase, the repertoire of activities that the children can perform increases so that opportunities for strengthening activities expand.

Arm and Hand Weakness

Muscles that control large movements of the arms often are weak in children who have difficulty with motor skills. These children may have balance, coordination, or perceptual problems that cause them to avoid strengthening movement activities; and therefore they fail to develop strength at the rate of children who engage in these motor activities at every opportunity. Other children may have weak shoulders and arms because of neuromuscular disease or central nervous system disorder.

Before focusing on increasing arm strength, it is important to determine that weakness is interfering with the child's performance of school or home activities. Children with weak arms may have trouble using large movements of the whole arm (especially above head level) for writing or drawing on a chalkboard, carrying heavy objects, carrying a tray in the cafeteria, opening jars, and performing sports and gym-class activities such as swinging a baseball bat or hanging from gym bars. Since the strength necessary for performing these tasks develops with age, compare the child's performance with that of a wide range of children who are the same age to determine whether strength is low.

Beneficial Activities

It is important to encourage children with arm weakness to try to complete self-care tasks independently (rather than to do these tasks for them) and to assist only after they have made a serious attempt. Because activities that require strength are difficult and slow for a weaker child, others often provide help and prevent the child from increasing strength through practice.

If weakness is interfering with a child's ability to perform educational, recreational, or self-care tasks, a reasonable approach is to encourage as many strengthening activities as possible. Throughout the day, incorporate these

activities into the classroom, playground, and home routines. If progress is unsatisfactory, it may help to choose a specific exercise or activity (such as sitting pushups) and have the child perform a set number of repetitions each day at the same time. Increase the number of repetitions as strength improves. Stop focusing on strengthening activities when the child no longer has difficulty performing functional activities, even if strength is still below “average.”

Basically, any activity that involves pushing or pulling with the arms against resistance will strengthen the arm muscles. The greater the resistance and the more repetitions, the better the exercise. Resistance and repetitions are increased slowly as strength increases, so that the child experiences success and doesn't become frustrated.

Types of activities that help with strengthening include manipulating resistive materials (such as modeling clay, putty, and cookie dough); playing with push-or pull-toys (such as pop-beads); games that involve pushing or pulling with the arms (such as tug-of-war, swinging from gym bars, and climbing playground equipment); and building things with carpentry tools and construction kits.

Compensatory Strategies

Children do not need to have strong arms to perform most self-help and academic tasks adequately. The arms generally put the hands into the optimal position for an activity and hold them there or move them during the activity.

When devising ways to compensate for weak arms, think of how to externally stabilize the hands in the desired position, or how to minimize the resistance involved. For example, if a child is unable to control scissors because the arms are too weak to hold hands in the right position, teach the child to rest elbows or forearms on the table top. If a child has difficulty writing above head level on the chalkboard, allow writing at head level or below, or even on the desk, to decrease the pull of gravity on the arms.

Child's Name _____

Date _____

ARM STRENGTH
Classroom and Individual Practice
CLASSROOM ACTIVITIES

Purpose

To increase strength in the large muscles of the arms and hands

Materials

Regular classroom materials and equipment (chalkboard, desk, chairs, sponge)

Procedure

Whenever possible, encourage the child to perform activities that will increase strength. Any activity that involves pushing or pulling with the arms against resistance is helpful. When grasp is involved, strengthening will occur in the hands as well as the arms and shoulders. Helpful activities that can be encouraged throughout the day include these:

1. Writing or drawing above head level on chalkboard or mural, using whole-arm movement (not resting hand on surface of board and using finger movement).
2. Lifting or pushing objects to assist with cleaning or rearranging the classroom (putting chairs on desk tops at the end of the school day).
3. Erasing or washing the chalkboard or desk tops with sponge or cloth and wringing them out.
4. Scribbling or coloring over templates or other textured materials. (This requires lots of rubbing while holding a writing implement; and it strengthens the muscles used for writing.)
5. Stirring or kneading materials of a thick consistency, such as cookie batter or homemade modeling clay.
6. Any manipulative activity with resistant materials, such as modeling clay, putty, or dough.
7. Sitting pushups.
8. Using a desk-top stapler or desk-top three-hole punch.



Desired Response

Child uses large movements of the whole arm. As strength increases, child chooses more of this kind of activity spontaneously and performs with greater ease.

Undesired Responses

Child rests hands or forearms and uses finger or hand movement.
Child is unable to perform activity or is fatigued for more than a few minutes after completing it. (Activity was too strenuous and should be simplified.)

Variations and Adaptations

Modify all of these activities to ensure success. Grade them to increase strength requirements as improvement occurs. For example, a child who is assigned the task of placing chairs on desk tops at the end of the day might start with one chair and increase the number of chairs as ability improves. This enables the child to see progress in functional skills.

Carry out arm-strengthening activities from a sitting position if balance is a problem, or from a wheelchair or prone stander if mobility is limited.

If arms are too weak to enable writing on the chalkboard above head level, let the child write at or below head level. If this is too tiring, let the child write horizontally on desk or table top.

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

Child's Name _____

Date _____

ARM STRENGTH
Classroom and Individual Practice
SITTING PUSHUPS



Purpose

To increase strength in the large muscles of the arms and hands

Materials

Classroom chair or floor

Procedure

Floor pushups. Child sits cross-legged on the floor; places arms at sides, palms resting on the floor; and straightens arms to slowly lift body weight off floor. Child relaxes arms and returns slowly to normal sitting position.

Chair pushups. Child sits on a chair, feet resting on the floor; grasps sides of the chair seat near the front; shifts weight forward so that straight arms are supporting some body weight; and slowly bends elbows so that body weight is lowered. Then child slowly straightens arms to bring body back up to a forward sitting position, and slowly shifts weight backward until weight is again resting on buttocks.



Desired Response

Child supports body weight for increasing periods of time or for more repetitions.

Undesired Response

Child shifts weight too far forward so balance is lost (especially when doing chair pushups).

Variations and Adaptations

Floor pushups are more appropriate than chair pushups for children with poor balance or hyperactivity.

Sitting pushups can be done by children in wheelchairs.

Sitting pushups can be fun for all children in the classroom and can be carried out during breaks between desk or floor activities.

Encourage children to increase the amount of time they can hold themselves up, or the number of times they push themselves up on successive days of performing this activity. Have them chart their improvement over a period of weeks or months.

Straight-leg sitting may be easier for children with decreased balance or flexibility.

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



Child's Name _____

Date _____

ARM STRENGTH
Classroom and Individual Practice

PRESCHOOL CLASSROOM ACTIVITIES

Purpose

To increase strength in the large muscles of the arms and hands

Materials

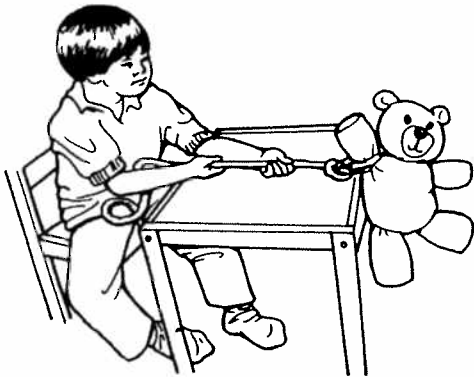
Preschool classrooms contain many materials that strengthen arm and hand muscles. Especially useful toys and materials include:

- Hammering sets and beginning carpentry tools
- Climbing equipment
- Pop-beads and interlocking toys that can be pulled apart and pushed together
- Wagons
- Wheelbarrows and other push toys
- Resistive materials (modeling clay, dough, putty)
- Templates and textured surfaces for scribbling on
- Swings
- Shovels and other digging tools
- Large foam or vinyl blocks for pushing and pulling

Activities

1. Encourage play with the kinds of toys listed above as much as possible. Any activity that involves pushing or pulling against resistance with the arms will build strength when repeated over time. Grade each activity so that it is challenging but not frustrating.
2. Have child pull a wagon or push a wheelbarrow. The wagon or wheelbarrow can be loaded or unloaded to modify the amount of weight to be pulled. Ask the child to pull the wagon (or push the wheelbarrow) to a designated place. Increase the distance and add more weight (throw in another teddy bear) as the child's strength increases. Incorporate the activity into a "make believe" game. This can be very rewarding because the children are able to see that they are getting stronger when they pull more (or farther) than before.

3. Have child do various "walks" that place body weight on the arms.
 - Bear Walk. Child bends forward at the waist and touches floor with hands. Keeping the head up and legs stiff, child moves forward on alternating legs. (This is normally accomplished by four years of age.)
 - Wheelbarrow Walk. Child keeps back straight and supports body weight on straight arms as helper holds child's feet and supports the back end of the body. Child walks forward on arms and helper follows, holding feet. If child needs more support, hold child at the knees. Increase number of steps or distance as strength increases.
4. Encourage stirring cookie dough, kneading dough, rolling dough for cookies, cutting cookies off roll with plastic knife, and using cookie cutters.
5. Set up an obstacle course that requires the child to pull a wagon from one spot to another, push big blocks out of the path, climb up and down a climber (or up and down one or two rungs), swing from a rope, crawl, and other strengthening activities. Add more activities as strength increases. This can be done as a group activity or relay.
6. Tie rope or string around a toy car or teddy bear. Place toy on a table. Child sits in a chair facing table, pushes toy off the far edge while holding onto the rope, and "rescues" the toy by pulling it up and over the edge of the table, using hand-over-hand method. Increase the weight of the toy as strength increases. Groups of children can cooperate to rescue very large objects.



Desired Response

As strength increases, more of this kind of activity is chosen spontaneously and is performed with greater ease.

Undesired Response

Child is unable to perform activity or is fatigued for more than a few minutes after completing it. (Activity was too strenuous and should be simplified.)

Variations and Adaptations

If child is too weak to push or pull weight against added resistance, decrease the demands of the task by encouraging pushing or pulling along the surface of a table top, lap tray, or the floor.

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

Child's Name _____

Date _____

ARM STRENGTH
Classroom and Individual Practice

CLAY, DOUGH, AND PUTTY ACTIVITIES

Purpose

To increase strength in the large muscles of the arms and hands

Materials

Any resistive material works well for strengthening. The stiffer (more resistive) the consistency, the more vigorous the exercise. Start with softer materials like dough before progressing to stiffer clays and putty.

Activities

1. Make your own dough and let child do some mixing and kneading; or use the kind of clay that requires kneading to release air bubbles before firing in the kiln.
2. Let child roll dough flat with a rolling pin and use cookie cutters to make holiday ornaments that can be dried (or fired in the kiln or oven) and painted.
3. Child rolls "snakes" with hands and outstretched fingers. Child places snakes on top of each other or winds to form coil pots.
4. Egg hatch. Child presses large pieces of dough or clay between palms of both hands to make a large ball (an ostrich egg).



Child "hatches the egg" by holding it with both hands and pulling it apart into two smaller pieces. Child takes the small pieces and, one at a time, rolls them in the palms to make two round balls ("baby birds"). Child pinches each ball to make a "beak" and makes eyes. Child squishes the birds back into a big ball, using both hands (or saves them for future painting).

5. Putty string ball. Child grips putty with both hands and pulls straight out to the sides to form a long strip of putty. Child makes several strips and rolls strips together between palms to form a ball.
6. Clay cutting. Have child use a plastic knife to cut through clumps of clay or dough. Use a slightly larger piece of clay after each cutting until child is unable to cut all the way through. Have child put the two halves of the largest fully cut piece back together, form it into a ball between palms, and save it. On subsequent days, have child begin the activity by cutting through a ball of clay that is the same size as the one saved last, and continue by cutting a larger one. Always save the largest successful cut for future comparison.



7. Putty ring. Child rolls putty into thick "snake" about seven or eight inches long. Child places palms together while helper wraps snake around the outside of child's hands, at about knuckle level, and squeezes the ends together to form a ring. Child slowly pulls arms outward to expand the ring, seeing how big a ring can be made before it breaks.

Desired Response

Child uses movement of the upper arms for these activities. As strength increases, these activities are performed more easily and for longer periods of time.

Undesired Response

Child uses finger and wrist movement for these activities, with upper arms held against trunk.

Variations and Adaptations

Several brands of silicone therapy putty are available in many different levels of resistance. This is handy for increasing or decreasing the difficulty of these activities to match the child's ability level. Resistive putty also comes in many colors (according to consistency), which makes it tremendously appealing to children.

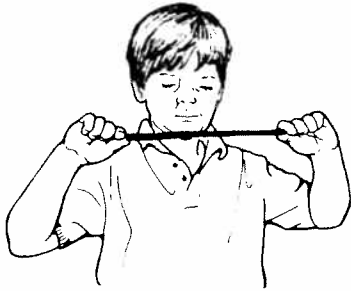
If child doesn't have adequate strength but wants to complete one of the projects listed, provide assistance only as much as needed. Encourage child to increase the amount done independently on subsequent attempts.

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

Child's Name _____

Date _____

ARM STRENGTH
Classroom and Individual Practice
THERAPY MATERIALS



Activity 1



Activity 2



Activity 3

Purpose

To increase strength in the large muscles of the arms

Materials

Latex rubber strips and tubes are available commercially. They come in various colors depending upon resistance. They can be kept in a desk and used once a day to ensure regular strengthening exercise.

Activities

1. Start with a rubber strip that provides the least resistance. Cut approximately 20 inches and tie ends with a square knot to form a ring. Child grabs with both hands and pulls hands apart to the sides.
2. Child pulls front to back, first with one hand in front, then reversed.
3. Child pulls top to bottom, first with one hand on top, then reversed.
4. Child crosses forearms and pulls ends outward.

Desired Response

Child uses muscles of the whole arm for pulling. Upper arms are held away from the body. As strength increases, child pulls bands or tubes farther, holds position longer, and performs more repetitions with greater ease.

Undesired Responses

Child is unable to perform activity or is fatigued for more than a few minutes after completing it. (Activity was too strenuous and should be simplified.) During pulling, child uses wrist or forearm muscles for pulling, with upper arms held against trunk.



Activity 4



Variations and Adaptations

The rubber strip can be used without tying in a ring for less resistance. The child grabs either end of the band and pulls.

Thera-Band® Plus has handles which make gripping easier.

If arm strength is a problem and grasp is too weak for the above activities, the activities can be done with the tubing or band tied around the hands, wrists, or forearms.

Thera-Band® Plus is a registered trademark of Hygenic Corp.

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

Child's Name _____

Date _____

ARM STRENGTH
Gym, Playground, and Extracurricular Practice

GYM AND PLAYGROUND ACTIVITIES

Purpose

To increase strength in the large muscles of the arms and hands

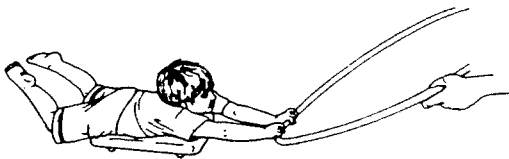
Materials

Gymnasiums and playgrounds contain many kinds of equipment that strengthen arm and hand muscles. Some especially useful pieces of equipment include:

- Poles and ropes to climb
- Monkey bars, jungle gyms, and other climbing equipment
- Scooterboards
- Ropes or towels for tug-of-war type games
- Chinning bar
- Heavy medicine ball

Activities

1. Encourage use of the equipment listed above as much as possible. Any activity that involves pushing or pulling against resistance with the arms will build strength when repeated over time. Grade each activity so that it is challenging but not frustrating.
2. Have child do activities that involve supporting body weight on the arms, such as crab walk, mule kicks, walrus walk, and headstands. If child is unable to perform a headstand, use a large wedge, wall, or a helper to support the legs and trunk while child supports weight on the arms for short periods.



Crab Walk. From a squatting position, child reaches backward and places both hands flat on the floor behind. Child raises trunk until head, neck, and body are parallel to the floor; child walks or runs in this position. Most children can accomplish this walking pattern by eight years of age.

Mule Kick. Child squats and places outstretched hands on the floor between the knees. Child supports body weight on arms and kicks legs vigorously in the air behind. Child can kick legs together or alternately. This is usually accomplished by age ten.

Walrus Walk. Child lies on stomach on floor and pushes body weight up onto arms, keeping legs straight. Child moves forward on arms, dragging legs behind. Children can usually do this pattern by age eight.

3. Encourage activities that involve grasping and pulling on ropes or towels, such as Tug-of-War, Pull-You-Over, or Cone Pull.

Tug of War. Form a center line with tape or chalk. Arrange teams of children who are fairly evenly matched for strength. Team members grab a long rope on either side of the center line and try to pull the other team members over the line.

Pull-You-Over. Have two children face each other across the center line. Each child holds one end of a towel or piece of rope and tries to pull the other across the line. If the children are not equally matched for strength, place the stronger child closer to the line so the weaker child has an advantage.

Cone Pull. Tie a rope around a number of cones. Child pulls cone toward self, using hand-over-hand method. Increase number of cones as strength increases. Rope can be pulled through a hanging ring so child is pulling the cones off the ground and up toward the ring.

4. Encourage child to climb hand-over-hand up a pole or rope as far as possible. Mark the spot by wrapping with tape; ask child to try to "beat the record" on successive days. Mark that spot with tape and write the date of achievement on each piece of tape so that progress is clearly visible as tape goes higher and higher.

5. Set up an obstacle course that requires child to pull or push heavy objects, climb up and down a climber, swing from a rope, propel a scooterboard with the arms (on stomach or sitting), and other strengthening activities. Add more activities as strength increases. This can be done as a group activity or relay.

6. Scooterboard activities. Child lies on stomach on scooterboard and uses arms to propel self through obstacle course.

Child sits or lies on stomach on scooterboard, holds onto the end of a rope, and uses hand-over-hand method to pull self toward an adult or another child holding the other end of the rope. Distance is increased as strength increases.

Child lies on stomach on scooterboard with palms flat against wall and elbows bent; pushes self away from wall by extending arms quickly; uses tape to mark the spot where scooterboard stops. Child attempts to increase distance.

Desired Response

As strength increases, more of this kind of activity is chosen spontaneously and is performed with greater ease.

Undesired Response

Child is unable to perform activity or is fatigued for more than a few minutes after completing it. (Activity was too strenuous and should be simplified.)

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



Child's Name _____

Date _____

ARM STRENGTH
Gym, Playground, and Extracurricular Practice

SPORTS AND EXTRACURRICULAR ACTIVITIES

Purpose

To increase strength in the large muscles of the arms

Activities

Encourage child to participate in this kind of activity on a regular basis. Choose activities based on the child's interests and enjoyment. Since these kinds of activities focus on an area of known weakness, be sure they are taught or approached in a noncompetitive and individualized manner. It is equally important to find and encourage activities that build on the child's strong motor areas.

- Baseball. Use a light ball, and increase weight as strength improves.
- Swimming. The resistance provided by the water makes this an excellent activity for strengthening arm muscles. Encourage child to practice various arm strokes (breaststroke, crawl, sidestroke) even if they are not used functionally during swimming. Have child practice in a kneeling position or while adult supports child's trunk in the water. Make sure that child keeps fingers together to "cup" hands so water resistance is increased.
- Weight lifting. Consult an experienced physical fitness professional to develop a simple exercise program for improving arm strength if child is interested in pursuing this sport. For some children (usually older elementary age and up), this can be a very rewarding activity because progress is very clear as weight or repetitions increase.
- Bowling.
- Tennis.
- Carpentry. Hammering nails into scrap lumber, making simple projects, sanding, using pliers and screwdrivers are all excellent for strengthening arms.
- Gardening and lawn work. Pushing a lawn mower, raking, hoeing, and digging with a trowel can be modified to increase or decrease the amount of strength required. For example, the child can mow one strip of the front yard one week, two the next week, and so on. (Caution: A child with weak arms and hands may not have adequate control for lawn mowing and should be closely supervised.)

- Stirring with a large spoon, kneading dough, holding an electric mixer, rolling dough with a rolling pin, and many other components of cooking are great strengthening exercises for the arms and hands.
- Weaving with a loom.

Desired Response

As strength increases, more of this kind of activity is chosen spontaneously and is performed with greater ease.

Undesired Response

Child is unable to perform activity or is fatigued for more than a few minutes after completing it. (Activity was too strenuous and should be simplified.)

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

Child's Name _____

Date _____

**ARM STRENGTH
Compensatory Strategies**

CLASSROOM AND HOME ADAPTATIONS

Purpose

To improve child's ability to perform fine motor activities when arm strength is weak

Strategies

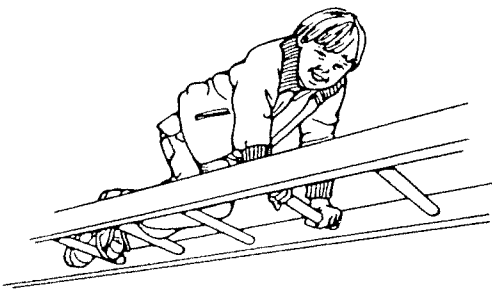
To improve performance consider:

1. Decreasing resistance of objects to be held or moved.
2. Stabilizing arms in desired position.
3. Using whole-body movement when using arms instead of moving arms away from or toward body independently.
4. Using both arms.
5. Externally stabilizing objects that cannot be held securely.

These activities can be applied to a number of classroom and home activities. Following are examples of these types of adaptation.

Decreasing Resistance

1. If child has trouble writing on the chalkboard above head level, encourage writing at or below head level, thus decreasing the pull of gravity on the arms. If writing on the board is too difficult, let child write on a desk or other horizontal surface.
2. In the gym or on the playground, if child cannot hang by hands from climbers or monkey bars, encourage crawling on top of the bars (decreasing the pull of gravity on the hands and arms); or stand below the child and support some body weight.
3. Use light balls and bats and other equipment or toys that are held, swung, or thrown.
4. Sand down parts of toys to decrease force needed for attaching and detaching pieces. For example, sand the ends of Tinkertoy® sticks so they slide easily into the holes in the connecting pieces.



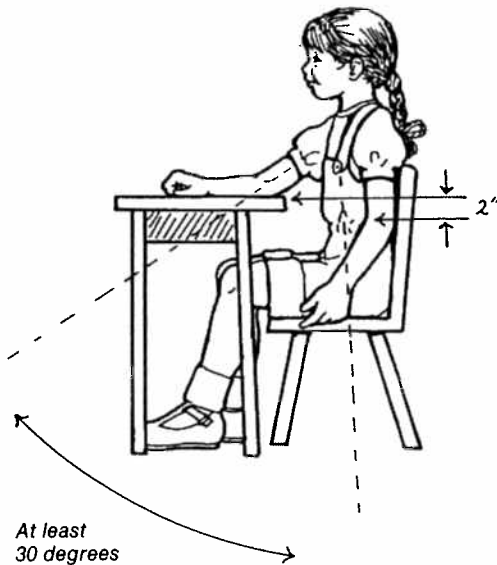


Stabilizing Arms in Desired Position

1. If child is unable to use whole arm with sufficient strength, teach child to stabilize upper arms against the chest when catching or throwing balls.

If child still is unable to catch a ball, encourage child to catch against the chest.

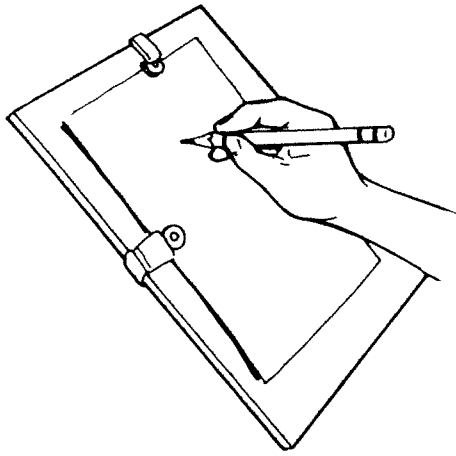
2. If child's arms are not strong enough to provide firm support for hands when child cuts with scissors, encourage child to stabilize forearms or hands on the table.
3. When child is manipulating objects in hands, encourage child to stabilize upper arms against the trunk or forearms and sides of hands on the table.
4. Teach child to hold the upper arms against the trunk when carrying heavy objects (such as a lunch tray). This will help to support some of the weight of the object against the trunk.



5. Proper height of working surfaces is important for providing stability for the arms during fine motor activities. Most people use arms and hands best when upper arms are held forward slightly from the trunk (at least 30 degrees). The working surface should be two inches above the level of the child's bent elbow when the child is seated upright in a chair, with feet flat on the floor. If the surface is too low, child will use arms without optimal support or will bend over to stabilize the arms, resulting in poor posture.
6. Slanted desk tops provide added support for the forearms during reading and writing activities.
7. Arm slings with overhead suspension systems can be purchased commercially or made fairly easily. They can be used to support the forearms during computer use.

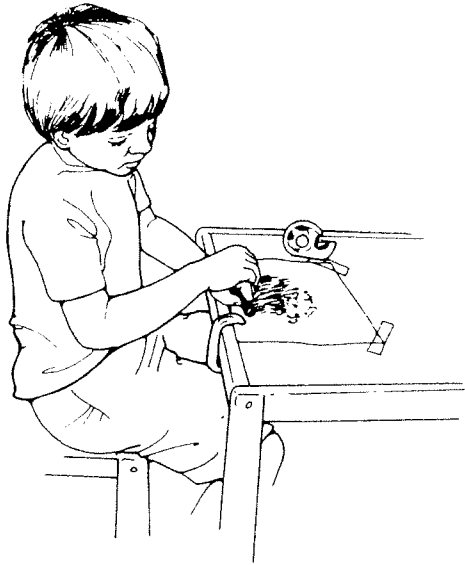
Using Whole-Body Movement and Both Arms

1. Teach child to move the entire body in the desired direction when pushing or pulling objects, rather than to stand or sit in one place and move the object with the arms. Whole-body movement enables the larger muscles of the legs and trunk to assist, and it provides the added weight of the body to the force exerted. For example, when lifting a box from a table, instead of remaining seated and using outstretched arms for lifting and moving, child stands directly in front of box, pulls it against chest with upper arms supported against trunk, and walks to the new location.
2. If child is unable to use desk-top stapler or three-hole-punch tools, encourage child to use both hands and to stiffen arms and push down by shifting body weight forward, rather than keeping body still and straightening arm to push down.



Stabilizing Objects During Two-Handed Manipulation

1. If the nondominant hand is not strong enough to secure paper during writing and drawing activities, tape paper to desk; or use a one-arm paper holder (a commercially available magnetic board and metal holders) to hold paper in place.
2. If child is unable to hold objects steady due to weak arms, use adaptive equipment to hold objects in place. Child then can use both hands to manipulate with more force, rather than using one hand for holding and the other for manipulating. Equipment includes:
 - Suction plates, to hold plate steady while pushing food onto utensil
 - Dycem® nonslip material, to assist with stabilizing manipulatives while exerting force with the dominant hand
 - Clamps, to hold templates, pegboards, toys, and manipulatives



Comments

These suggestions may improve performance of fine motor tasks. However, strength will not increase unless strengthening activities also are encouraged. Do not use compensatory strategies exclusively unless it has been determined that the child's arm strength will not improve to a functional level with practice, making compensation the top priority.

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

