

Care of the Musculoskeletal System and Mobility Care

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Musculoskeletal System and Mobility Care

Overview

Movement of the body is dependent on the proper functioning of the musculoskeletal and nervous systems. If any one of these parts of the body is altered or injured, the result can be loss or change in the body's ability to move.

Muscle movement and functioning may be altered by a number of causes. Damage to a portion of a student's brain may result in a break in the transmission of impulses to the muscles and loss of the muscles' ability to function. In addition, muscles may lose their ability to contract because of disease or deterioration due to a decrease in the number of nerves acting upon them. They may also lose function due to lack of use.

Normal daily activities keep the muscles loose and pliable by maintaining range of motion in the joints and related muscles. If movement is less frequent and limited, the muscles become less pliable and shortened. The shortened muscles pull the joint into an abnormal position, creating a contracture. The contracture causes greater effort for movement, increased wear on the joints, and decreased range of motion. Loss of normal muscle movement can make bones porous and soft.

Adaptive equipment (desk, chairs, feeding equipment) and frequent movement should be available as needed to assist the student to maintain optimal function in the school environment. Activities in the classroom, cafeteria, and physical education program may need to be modified to meet the student's needs.

Source:

Graff, J., Ault, M., Guess, D., Taylor, M., & Thompson, B. (1990). Therapeutic Management. In *Healthcare for Students with Disabilities, An Illustrated Medical Guide for the Classroom*. Baltimore: Paul H. Brookes Publishing, pp. 119-144.

Physical Mobility Assistance

Overview

The purpose of the following procedures is to help the student who requires physical mobility assistance to maintain good range of motion, good muscle length, and as much independence as possible in normal daily activities.

Potential Settings

Students who need physical mobility assistance participate in regular school activities with modifications that should be determined by the family, health care provider, physical therapist, occupational therapist, school nurse, and school staff. Staff who have contact with the student should be familiar with how to assist the student with movement and positioning.

Staff Preparation

Support of the student who requires assistive devices for ambulation can be administered by the school nurse, physical therapist, occupational therapist, teacher aide, or other staff person who has general training in the assistive device of the student. General training should cover the student's specific health care needs, potential problems, and how to obtain assistance should problems occur, and appropriate lifting procedures.

The basic skills checklist in Appendix B can be used as a foundation for competency-based training in appropriate techniques. The checklist outlines specific procedures. Once the procedures have been mastered, the completed checklist serves as documentation of training.

Components of the Individualized Health Care Plan

Each student's IHCP must be tailored to the individual's needs. The following section covers the procedure for assisting the student who requires assistance with mobility and possible problems and emergencies that may arise. It is essential to review it before writing the IHCP.

A sample plan is included in Appendix A. For a student who requires assistance with mobility, the following items should receive particular attention:

- Student's underlying condition and possible problems associated with the condition or treatment
- Student's baseline status (including skin condition, level of mobility)
- Type of physical mobility assistance student requires
- Reason student requires the physical mobility assistance
- When assistive device is to be used
- Care of any assistive device
- Standard precautions

Source:

Graff, J., Ault, M., Guess, D., Taylor, M., & Thompson, B. (1990). Therapeutic Management. In *Healthcare for Students with Disabilities, An Illustrated Medical Guide for the Classroom*. Baltimore: Paul H. Brookes Publishing, pp. 119-144.

Smith, SF, Duell, DJ, & BC Martin. (2004). *Clinical Nursing Skills*. (6th ed.). New Jersey: Prentice Hall, 350-353

Procedure for Positioning a Student

Note: Equipment and supplies provided by parents.

1. Review the health care provider's orders and student's individualized health care plan.
2. Explain the procedure to the student at his/her level of understanding. Encourage the student to participate as much as possible.
3. Wash hands.
4. Assemble equipment as needed for positioning of student. Know how the equipment works before using it with the student. Equipment varies with students and position. Talk with family to determine what equipment is used at home.
5. Have assistance available as needed to ensure the safety of the student and staff. The degree of assistance depends on the student's size, how much the student can assist the procedure, and the size and physical ability of the staff person.
6. **Follow the principles of good body mechanics when lifting or moving the student.** Good body mechanics prevent back injury.
7. Change the student's position as needed or specified. Change position frequently, unless contraindicated, to prevent dependent edema and to stimulate circulation. **Positioning should be individualized for each student.**
8. The following guidelines are for positioning a student without musculoskeletal abnormalities such as a dislocated hip. The guidelines **may not** be appropriate for all students. These guidelines should only be used after consulting the student's health care provider, physical therapist, school nurse, or other persons who are knowledgeable about the student's condition.

Position	Action
Head is in alignment with the spine, both laterally, and front to back.	<i>Place pillow under head, so that it reaches under the shoulders.</i>
Position trunk so that hip flexion is minimized.	<i>Place small pillow under the small of the back, if comfortable.</i>
Slightly flex arms at elbow.	<i>Position arms comfortably at side with hands open. Use handroll if necessary.</i>
Extend legs in neutral position with toes pointed to ceiling.	<i>Support feet with a vertical support, so that student can brace his/her feet to keep them upright.</i>
Suspend heels in the space between cot and footboard.	<i>Place small pillow under ankles to prevent pressure on heels.</i>
Place hip rolls under greater trochanter (hip) in the area of hip joint and upper thigh.	<i>Place small pillows or rolled towels by the hips and upper thigh to prevent legs from turning outward.</i>
Align head with spine.	<i>Place pillow under head.</i>
Align body so that it is not twisted.	<i>Place pillow lengthwise at the back, anchor the pillow by pushing pillowcase edge under student's back. Then fold outer side of pillow</i>

Position	Action
	<i>under and tuck it against the student for added support.</i>
Support slight hip abduction by positioning hip slightly forward.	<i>Flex hip and knee of upper leg, bringing upper leg forward so that it doesn't rest on lower leg. Position pillow lengthwise under upper leg supporting the entire leg including the foot and ankle.</i>
Flex arm at elbow and shoulder joint.	<i>Position lower arm in comfortable position. Place upper arm and hand on pillow with elbow and shoulder flexed. Use hand roll if necessary.</i>
Turn head laterally and align with body.	<i>Turn head to side and place on small flat pillow if necessary.</i>
Abduct arms (slightly away from body) and externally rotate at the shoulder joint. Flex elbows.	<i>Place arms at side, using handrolls if necessary. Place small foam pads or pillows as needed under shoulders.</i>
Place small flat support under pelvis at level of umbilicus and extending to upper third of thigh.	<i>Place flat pillow under abdomen to align spine and help breathing (unless individual is obese or abdomen protrudes).</i>
Place lower extremities in neutral position.	<i>Extend legs in a comfortable position.</i>
Suspend toes over edge of cot.	<i>Either position student so that the toes extend over the end of the cot or place a pillow under the ankles so the toes do not touch the cot.</i>

9. Inspect skin surfaces regularly for signs of irritation, redness, or evidence of pressure.
10. Make sure the student is safe and comfortable.
11. Wash hands.
12. Clean and store equipment as needed.
13. Document change of position and condition of skin surfaces in the student's log. Report any changes from student's usual pattern to school nurse and family.

Sources:

- Graff, J., Ault, M., Guess, D., Taylor, M., & Thompson, B. (1990). Therapeutic Management. In *Healthcare for Students with Disabilities, An Illustrated Medical Guide for the Classroom*. Baltimore: Paul H. Brookes Publishing, pp. 119-144.
- Smith, SF, Duell, DJ, & BC Martin. (2004). *Clinical Nursing Skills*. (6th ed.). New Jersey: Prentice Hall, 350-353
- Smith-Temple, J & JY Johnson. (2002). *Nurses' Guide to Clinical Procedures*. (4th ed.). Philadelphia: Lippincott Williams & Wilkins, 366-374.
- South Carolina Department of Health and Environmental Control, Division of Children's Health. (1990). Positioning. In *Manual of Nursing Procedures for South Carolina Schools*.

Procedure for Assisting Student with a Cane

Note: Equipment and supplies provided by parents.

1. Review the health care provider's orders and student's individualized health care plan.
2. Verify if the student will be using 1 or 2 canes and the type of cane used:
 - Straight-legged or standard cane
 - Tripod or three-pronged cane
 - Quad cane
3. Explain the procedure to the student at his/her level of understanding. Encourage the student to participate as much as possible.
4. Check the fit of the cane for the student's height. With the student standing with his/her elbow flexed at a 20-30-degree angle, place the cane tip 6 inches to the side of the little toe, the handle should be approximately level with the greater trochanter (hip).
5. Make sure that the cane has the student's name on it.
6. Teach and/or reinforce gait:
 - Hold the cane on the stronger (unaffected) side.
 - Keep the cane close to the body to avoid leaning on it.
 - Advance the cane 4 inches in front of the body and move the weaker leg even with the cane.
 - Shift weight to affected leg and cane and move unaffected leg ahead of cane.
During teaching, accompany student by walking on unaffected side.

If the student is unable to hold the cane with the hand opposite the weak leg, he/she can hold the cane on the same side as the weak leg and advance both cane and weak leg together.

7. Teach stair climbing:
 - Upstairs: Advance unaffected leg up to next step; followed by the cane; followed by the weaker leg.
 - Downstairs: Place the cane and weaker leg on next lower step, and then step down with the unaffected leg.
8. Arrange for the student to use the elevator. Use of the elevator decreases the possibility of injury to the student or others on the stairs. If an elevator is not available, the student may need all of his/her classes on the ground floor.
9. Arrange transportation as needed for fire drills and emergency evacuations. Elevators are not available during fire drills. Prearrange an evacuation plan for the student **prior** to fire drills or emergencies.
10. Safety tips:
 - Make sure rubber cane tips are in good repair. Tips should be wide, provide good suction, and replaced promptly if worn.
Check that screws and nuts are tight.
 - Designate a place in the classroom for the cane. (Cane should be kept next to the student in the classroom if possible).
 - Encourage student to keep hands free to handle cane. Student should be encouraged to carry possessions in a light backpack or have another person carry the possessions.

- If necessary, arrange for student to leave each class 5 minutes early. Leaving early allows the student to be out of the hall during regular changing of classes.

11. Document teaching and student's ability to walk with a cane.

Sources:

Smith, S.F., Duell, D. J., & Martin, B. C. (2004). *Clinical Nursing Skills: Basic to Advanced Skills*. (6th ed.). Upper Saddle River, NJ: Pearson/Prentice Hall, 364-366.

South Carolina Department of Health and Environmental Control, Division of Children's Health. (1990). Cane. In *Manual of Nursing Procedures for South Carolina Schools*.

Procedure for Assisting a Student with Crutches

Note: Equipment and supplies provided by parents.

1. Review the health care provider's orders and student's individualized health care plan.
2. Explain the procedure to the student at his/her level of understanding. Stress safety. Encourage the student to participate as much as possible.
3. Encourage student to wear non-skid, hard soled, low heeled shoes.
4. Check the crutches for the appropriate length while the student is standing erect. Place the crutch tip 6 inches in front and 6 inches to the side of the toes (tripod position). The arm-piece of the axillary crutch should be 2-3 finger widths from the axilla.
5. Check the handpiece. The handpiece should allow a 20-30 degree flexion of the elbow when the arm piece is 2-3 finger-widths below the axilla.
6. Use axillary arm pads. Teach student to place body weight on the palms, never on the axillae.
7. Check to ensure that the crutches have student's name on them.
8. Verify that the student is using the gait prescribed by the health care provider.

Crutch Gaits:

- 2-Point Gait
Advance right crutch and left foot together; then left crutch and right foot together.
Requires at least partial weight bearing on each foot. Requires more balance than 4-Point Gait.
 - 3-Point Gait
Balance weight on crutches. Advance both crutches and the weaker extremity at the same time; then advance the stronger extremity.
Requires strength and balance because the arms must support all the body's weight. Requires bearing all of weight on one foot. Useful when student cannot bear weight on one foot or when student has only one leg.
 - 4-Point Gait
Advance right crutch; left foot; left crutch; right foot.
This gait is used by a student who can move each leg separately and bear considerable weight on each foot.
 - Swing-To & Swing-Through Gait
Swing-to gait: advance both crutches forward; swing body to a position even with the crutches.
Swing-through gait: advance both crutches forward; swing body past crutches; bring crutches in front of body.
Usually used when student's lower extremities are paralyzed or the student uses braces.
9. Teach student how to stand:
 - Hold both crutches together in hand on affected side
 - Push down on stable support base with free hand; put weight on stronger leg; lift body

- Stand with back straight; bear weight on stronger leg and crutches
 - Place both crutches on same level as feet
 - Advance stronger leg while bearing down on crutches
 - Pull affected leg and crutches while bearing weight on stronger leg
10. Teach student how to sit:
- Make sure chair is stationary or braced against wall.
 - Place unaffected leg against chair.
 - Hold crutches together in hand on unaffected side.
 - Keep back straight and gently ease down supporting weight on crutches and stronger leg
 - When almost seated, gently hold on to arm of chair and complete the movement
11. Teach walking upstairs:
- Place crutches on same level as feet
 - Shift weight to crutches and advance unaffected leg to next step
 - Shift weight to unaffected leg and lift affected leg and crutches up to step
12. Teach walking downstairs:
- Place both crutches on same level as feet
 - Shift weight to stronger leg
 - Lower crutches to next step
 - Shift weight to crutches and transfer unaffected leg to step with crutches
13. Arrange for the student to use the elevator. Use of the elevator decreases the possibility of injury to the student or others on the stairs. If an elevator is not available, the student may need all of his/her classes on the ground floor.
14. Arrange transportation as needed for fire drills and emergency evacuations. Prearrange evacuation plans and make sure both student and staff are aware of them. Elevators are not available during fire drills.
15. Safety tips:
- Make sure rubber tips are in good repair. Tips should be wide, provide good suction, and replaced promptly if worn.
 - Make sure screws and nuts are tight.
 - Designate a place in the classroom for the crutches. (Crutches should be kept next to the student in the classroom if possible).
 - Encourage student to keep hands free to handle the crutches. Student should carry possessions in a lightweight backpack or have another person help carry the student's possessions.
 - If necessary, arrange for student to leave each class 5 minutes early to be out of the hall during regular changing of classes.
16. Document teaching and student's ability to walk with crutches.

Sources:

- Potter, P.A., & Perry, A. G. (2001). *Fundamentals of Nursing*. (5th ed.). St. Louis: Mosby, pp. 1008-1013.
- Smith, S.F., Duell, D. J., & Martin, B. C. (2004). *Clinical Nursing Skills: Basic to Advanced Skills*. (6th ed.). Upper Saddle River, NJ: Pearson/Prentice Hall, p. 368-373.
- Smith-Temple, J., & Johnson, J. Y. (2002). *Nurses' Guide to Clinical Procedures*. (4th ed.). Philadelphia: Lippincott, pp. 395-404.

Procedure for Assisting a Student with a Walker

Note: Equipment and supplies provided by parents.

1. Review the health care provider's orders and student's individualized health care plan.
2. Explain the procedure to the student at his/her level of understanding. Encourage the student to participate as much as possible.
3. Check the fit of the walker for the student's height. With the student standing erect and in line with the rear legs of the walker, the student's elbows should be flexed at a 20-30 degree angle when his/her hands are on the grips.
4. Make sure the walker has the student's name on it.
5. Teach and/or reinforce the gait:
 - Use the arms to move the walker forward 6-8 inches without flexing the trunk forward.
 - Move the weaker leg first while bearing weight on the walker.
 - Move the stronger leg even with the first.
 - The student's body should not come into contact with the crossbar.
6. Do not allow the student to use the walker on the stairs or inclines.
7. Arrange for the student to use the elevator.
8. Arrange transportation as needed for fire drills and emergency evacuations. Prearrange evacuation plans and make sure both student and staff are aware of them.
9. Safety tips:
 - Make sure rubber tips are in good repair. Tips should be wide, provide good suction, and replaced promptly if worn.
Make sure screws and nuts are tight.
 - Designate a place in the classroom for the walker. (Walkers should be kept next to the student in the classroom if possible).
 - Encourage student to keep hands free to handle the walker. Student should carry possessions in a lightweight backpack or have another person help carry the student's possessions. Do not hang book bags or other items from the walker because it may make the walker too heavy to move safely.
 - If necessary, arrange for student to leave each class 5 minutes early to be out of the hall during regular changing of classes.
10. Document teaching and student's ability to walk with a walker.

Source:

- Smith, S.F., Duell, D. J., & Martin, B. C. (2004). *Clinical Nursing Skills: Basic to Advanced Skills*. (6th ed.). Upper Saddle River, NJ: Pearson/Prentice Hall, p. 364.
- South Carolina Department of Health and Environmental Control, Division of Children's Health. (1990). Walker. In *Manual of Nursing Procedures for South Carolina Schools*.

Procedure for Assisting a Student with a Wheelchair

Note: Equipment and supplies provided by parents.

1. Review the health care provider's orders and student's individualized health care plan.
2. Explain the procedure to the student at his/her level of understanding. Encourage the student to participate as much as possible.
3. Obtain a consultation with a physical therapist, if needed.
The physical therapist can assist and facilitate implementation of the health care provider's orders for a wheelchair and can make recommendations regarding accessibility.
4. Verify that the school is fully wheelchair accessible. Provide student with precautions regarding most accessible routes.
5. Teach and assist the student to move from a surface the height of the wheelchair seat to the wheelchair:
 - Position wheelchair towards student's strongest side at a 45-degree angle to the transfer seat. Lock the wheels.
 - Move student to the edge of the transfer seat.
Allow student to assist as much as possible.
 - Standing in front of student, place arms under student's axilla or around student's back.
 - Rock student and, on a count of three, pivot student into wheelchair.
 - Position student in wheelchair to minimize pressure areas.
 - Remain in front of student to assess stability.
Allow student to sit for 2 minutes. Observe for dizziness relating to orthostatic hypotension. Do not leave student until he/she is stable. Safety belt can be used with larger students. Smaller students may be moved more easily by putting one arm under student's knees and the other supporting neck/back while lifting from transfer seat to wheelchair. Maintain good body mechanics when doing any lifting.
6. Teach and assist the student to move to a standing position:
 - Lock wheelchair wheels.
 - Make sure student can bear weight. Allow student to help as much as possible.
 - Instruct student to move to edge of chair with hands on chair arms.
 - Place one knee between student's knees (if student has a weak knee, brace it with your knee).
 - Instruct student to put stronger foot slightly under him.
 - Bend knees, lean slightly forward, and place arms around student's waist. Grasp a strong belt around the student's waist.
Stand close to chair with feet wide apart for a broad base of support.
 - Instruct student to push down with his/her arms, lean forward, and stand up on the count of 3.
 - Hold student closely.
 - On count of 3, rock weight to back foot bringing student forward to standing.
Use a cue that both you and the student can understand.
 - Instruct student to lock knees.

- Allow time for the student to balance him/herself.
7. Teach and assist the student to move from a standing to a sitting position:
 - Lock wheelchair wheels.
 - Allow student to assist as much as possible.
 - Remind student to feel back of chair with his/her legs
 - Instruct student to reach back for chair arms.
 - Hold the student at the waist by grasping a strong belt.
 - Shift weight to forward leg and guide student as he/she bends knees and sits in the chair.
 - Make sure student is safe and secure.
Use a seatbelt or harness as needed.
 8. Recharge batteries on motorized chairs or scooters each day according to battery manufacturer's directions.
 9. Arrange for the student to use the elevator.
Use of the elevator decreases the possibility of injury to the student or others. If an elevator is not available, the student may need all of his/her classes on the ground floor.
 10. Arrange transportation as needed for fire drills and emergency evacuations. Prearrange evacuation plans and make sure both student and staff are aware of them.
Elevators are not available during fire drills.
 11. Wheelchair safety tips:
 - Check rear wheels for movement when brakes are locked.
Brakes need to be repaired when they are ineffective or out of alignment. (Note: Routine maintenance should be performed at home.)
 - Make sure seatbelt is fastened.
 - Feet should be on footrests.
 - Arms and legs should be inside the chair when passing through a doorway.
 - Always lock brakes when wheelchair is stopped, even if empty.
 - Push at a walking speed. Hold on to wheelchair when pushing it.
Extra caution should be taken on gravel or uneven surfaces because the front wheels could become stuck and the wheelchair might tip over.
 - Never tilt chair far back, turn sharply, or stop rapidly.
 - Back wheelchair down ramps and curbs.
Both wheels should go over curb together so chair does not tip.
 - Push wheelchair forward going up ramps and curbs.
Tip chair back so that front wheels clear the curb. After clearing, put front wheels down on surface and lift back wheels over curb.
 12. If necessary, arrange for student to leave each class 5 minutes early.
Leaving early allows the student to be out of the hall during regular changing of classes.
 13. Document teaching and review student safety points.

Source:

- Smith, S.F., Duell, D. J., & Martin, B. C. (2004). *Clinical Nursing Skills: Basic to Advanced Skills*. (6th ed.). Upper Saddle River, NJ: Pearson/Prentice Hall, 322-331, 340-341.
- Smith-Temple, J., & Johnson, J. Y. (2002). *Nurses' Guide to Clinical Procedures*. (4th ed.). Philadelphia: Lippincott, pp. 356-365.
- South Carolina Department of Health and Environmental Control, Division of Children's Health. (1990). Wheelchair. In *Manual of Nursing Procedures for South Carolina Schools*.

Procedure for Assisting a Student with a Prosthesis

Note: Equipment and supplies provided by parents.

1. Assess the need for assistance for the prosthesis—an orthopedic device that is a replacement for a missing body part.
Review the health care provider's orders and student's individualized health care plan.
2. Explain the procedure to the student at his/her level of understanding. Encourage the student to participate as much as possible.
3. Obtain a consultation with a physical or occupational therapist if unfamiliar with using a prosthesis.
The physical or occupational therapist can assist and facilitate implementation of the health care provider's orders for a prosthesis.
4. Check gait and proper fit and function of the prosthesis.
 - Check health care provider's orders.
 - Observe student in prosthesis. Assure proper alignment of prosthesis and that stockinet or stump socks are put on under the prosthesis to absorb perspiration, prevent skin friction, and provide support. Prosthesis may be removed before showers and swimming.
 - Assess the condition and cleanliness of prosthesis.
 - Encourage student/family to keep prosthesis clean.
5. If necessary, remove prosthesis and observe skin condition under prosthesis daily.
Observe for areas of redness or skin breakdown. Report any areas of concern to school nurse, family, and/or health care provider.
6. Make sure that the prosthesis has the student's name on it.
7. Verify the ability of the student to function with prosthesis on.
Note if the student is able to move and function as he/she should. Report any concerns to school nurse, family, and/or health care provider.
8. If necessary, determine student's ability to remove and put on prosthesis.
Watch student put on and remove prosthesis.
9. If necessary, arrange for the student to use the elevator.
Use of the elevator decreases the possibility of injury to the student or others on the stairs. If an elevator is not available, the student may need all of his/her classes on the ground floor.
10. Arrange transportation as needed for fire drills and emergency evacuations. Prearrange evacuation plans and make sure both student and staff are aware of them.
Elevators are not available during fire drills.
11. Document care and findings on student log. Notify school nurse, family, and/or health care provider of any problems, changes, or concerns.

Source:

South Carolina Department of Health and Environmental Control, Division of Children's Health. (1990). Prosthesis. In *Manual of Nursing Procedures for South Carolina Schools*.

Possible Problems for a Student with a Prosthesis

Assessment	Intervention/Rationale
Inflamed joint	<i>Signs of inflamed joint are pain, warmth, swelling, or redness at joint. Notify school nurse and family and/or health care provider of any signs of inflammation.</i>
Reddened area on the skin under prosthesis	<i>May be beginning stage of pressure sore. Remove prosthesis if allowed. If reddened area does not disappear after 20 minutes, notify school nurse, family, and/or health care provider.</i>
Too small or ill-fitting equipment	<i>Notify school nurse, family, and/or health care provider.</i>
Joint contracture	<i>Characterized by stiffness or tightness in joint with resistance to movement. Notify school nurse, family, and/or health care provider of any decrease in movement of the joint.</i>

Source:

South Carolina Department of Health and Environmental Control, Division of Children's Health. (1990).
Prosthesis. In *Manual of Nursing Procedures for South Carolina Schools*.

Procedure for Assisting a Student with an Orthosis

1. Assess the need for assistance for the orthosis—an orthopedic device that is used to support a body part. It may be called a splint or a brace. Specific orthoses are often abbreviated. For example, the ankle-foot orthoses are frequently referred to as AFOs.
Review the health care provider's orders and student's individualized health care plan.
2. Explain the procedure to the student at his/her level of understanding. Encourage the student to participate as much as possible.
3. Obtain a consultation with a physical or occupational therapist if unfamiliar with using the orthosis.
The physical or occupational therapist can assist and facilitate implementation of the health care provider's orders for the orthosis.
4. Check gait and proper fit and function of the orthosis.
 - Check health care provider's orders.
 - Check full length of orthosis.
 - Observe student in orthosis. Mechanical joints should match body joints.
 - Observe orthosis for: worn areas, loose or missing buckles, straps or screws, cracks in the plastic, dents in the metal; condition of related areas (such as shoes).
 - Encourage student/family to keep orthosis clean.
 - A layer of thin clothing (such as a cotton undershirt or socks) can be worn under most orthoses to protect the skin. Keep free from wrinkles.
5. If allowed, remove orthosis and observe skin condition under orthosis daily.
Observe for areas of redness or skin breakdown. Report any areas of concern to school nurse, family, and/or health care provider.
6. If the child has decreased sensation, check circulation and skin condition frequently. If the child complains of a burning sensation under the orthosis, remove the orthosis (unless contraindicated) and observe skin for reddened areas.
7. Make sure that the orthosis has the student's name on it.
8. Verify the ability of the student to function with orthosis on.
Note if the student is able to move and function as he/she should. Report any concerns to school nurse, family, and/or health care provider.
9. Determine student's ability to put on and remove orthosis.
Watch student put on and remove orthosis.
10. If necessary, arrange for the student to use the elevator.
Use of the elevator decreases the possibility of injury to the student or others on the stairs. If an elevator is not available, the student may need all of his/her classes on the ground floor.
11. Arrange transportation as needed for fire drills and emergency evacuations. Prearrange evacuation plans and make sure both student and staff are aware of them.
Elevators are not available during fire drills.
12. Document care and findings on student log.
Notify school nurse, family, and/or health care provider of any problems, changes, or concerns.

Potential Problems for a Student with an Orthosis	
Observation	Action
Inflamed joint	<i>Signs of inflamed joint are pain, warmth, swelling, or redness at joint. Notify school nurse, family, and/or health care provider of any signs of inflammation.</i>
Reddened area on the skin under orthosis	<i>May be beginning stage of pressure sore. Remove orthosis if allowed. If reddened area does not disappear after 20 minutes, notify school nurse, family, and/or health care provider.</i>
Too small or ill fitting equipment	<i>Notify school nurse, family, and/or health care provider.</i>
Joint contracture	<i>Characterized by stiffness or tightness in joint with resistance to movement. Notify school nurse, family, and/or health care provider of any decrease in movement of the joint.</i>

Source:

South Carolina Department of Health and Environmental Control, Division of Children's Health. (1990).
Braces. In *Manual of Nursing Procedures for South Carolina Schools*.

Procedure for Cast Care

Note: Equipment and supplies provided by parents.

1. Review the health care provider's orders and student's individualized health care plan.
2. Determine the type of cast and whether the student is allowed to bear weight on it.

Casting Materials

- Synthetic (Fiberglass or Polyurethane resin)—most common casting material for children's casts. Available in colors and prints. Lightweight, allows for greater range of activity. Rough surface can snag clothing or be abrasive to skin.
 - Plaster of Paris—usually reserved for situations that require close conformity or small irregularly shaped areas such as the hand. Relatively heavy and must be kept dry.
3. Explain the procedure to the student at his/her level of understanding. Encourage the student to participate as much as possible.
 4. Check cast fit. Observe affected body part that is visible. Check for:
 - Color, swelling, and warmth of extremity
Extremity should be same color as a comparable extremity and warm, with no swelling (may have some swelling initially).
 - Capillary refill of toes or fingers
Capillary refill can be checked by pressing on the nailbeds of the toes or fingers. After releasing the nailbed, the color should return rapidly to the nailbed in 3 seconds or less.
 - Sensation and movement of toes or fingers
The student's ability to move and feel in the extremity can be evaluated by viewing his/her response to touch. Report any changes to school nurse, family, and/or health care providers.
 5. Observe the condition of the cast. Observe cast for cracks, dents, or soft spots. Edges should not be soft or crumbly. **Remind student not to put anything inside the cast**, especially pencils and other items found at school. Encourage student/family to keep cast clean.
 6. Observe for any complaints or problems noted by the student especially the five "Ps": pain, pallor, paresthesia, paralysis, pulselessness.
Notify school nurse, family, and/or health care provider of any pain, pressure, numbness, or decreased sensation in affected body part. Observe for skin rashes or reddened areas around the cast. Notify school nurse, family, and/or health care provider of any concerns.
 7. Protect cast from soiling. Some synthetic casts can be wiped with mild soap and water.
Cover cast with plastic wrap as needed at mealtimes and with elimination. If plastic wrap is soiled or wet, remove plastic wrap, clean skin, and reapply wrap.
 8. Skin may be rubbed with isopropyl alcohol (70%) 4 times a day, which may toughen the skin and help prevent breakdown. **Do not** use alcohol on red or irritated skin. **Do not** use oily substances (skin lotions) or powder in or around the edges of the cast. Oil softens

skin and can lead to skin breakdown, as well as softening of the cast. Powder will cake under the cast and cause skin breakdown.

9. If student is immobile, change position as needed to prevent breakdown. Avoid allowing affected limb to hang down for more than 30 minutes.
10. Do not put padding in cast.
Padding such as cotton or tissues may fall down in cast and decrease circulation.
Petaling cast edges with adhesive tape or moleskin may decrease skin irritation and protect the edges of the cast.
11. Caution student not to scratch under the cast. Itching can sometimes be relieved by an ice pack or by tapping on the cast.
Scratching can cause a break in the skin and lead to an infection.
12. If student has a spica cast, do not use the bar to lift student. Reclining wheelchairs can be used to accommodate the child in a spica cast.
Placing pressure on the bar may damage the cast.
13. Arrange for the student to use the elevator.
Use of the elevator decreases the possibility of injury to the student or others on the stairs. If an elevator is not available, the student may need all of his/her classes on the ground floor.
14. Arrange transportation as needed for fire drills and emergency evacuations. Prearrange evacuation plans and make sure both student and staff are aware of them.
Elevators are not available during fire drills.
15. Document care and findings on student log.
Notify school nurse, family, and/or health care provider of any problems, changes, or concerns

Sources:

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Problems that May Occur with Casts	
Intervention	Intervention/Rationale
Presence of pain greater than expected, decreased or absent movement, pain with stretching toes or fingers, decreased sensation in the affected extremity.	<i>These are indicators of pressure build-up under the cast. Pressure decreases circulation to affected extremity. Decrease in circulation can result in damage to muscle tissue and nerves. If pressure causes a decrease in circulation as described, raise casted extremity above rest of the student's body and contact school nurse, family, and health care provider immediately so that pressure can be relieved.</i>
Damaged cast	<i>Immobilize extremity and notify school nurse and health care provider of the extent of the damage.</i>
Plaster of Paris cast becomes wet or soiled	<i>Allow to air-dry. If wet area is large or cast is soiled, contact school nurse and family.</i>
Cast too tight	<i>Signs include: pale to white color of fingers or toes, fingers or toes cool or cold to touch, swelling of affected body part, numbness or tingling, decrease or absence of sensation or movement. May indicate beginning of reduced circulation to extremity due to pressure under the cast. Elevate extremity and notify school nurse, family, and/or health care provider immediately.</i>
Pain or gestures of pain	<i>May be due to pressure areas resulting from improper molding of cast, food, or foreign particles under cast, which can cause irritation and skin breakdown. Report any complaints or gestures of pain to school nurse, family, and/or health care provider.</i>
Drainage on cast or odor from cast	<i>May be due to an open sore, sloughing of the skin under the cast, or infection. Report any drainage or odor to school nurse, family, and/or health care provider.</i>

Sources:

- American Academy of Family Physicians. (Updated March 2002). Cast Care. Available at <http://familydoctor.org/handouts/094.html>.
- Bowden, VA & CS Greenberg. (2003). *Pediatric Nursing Procedures*. Philadelphia: Lippincott William & Williams, 158-166.
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Principles of Good Body Mechanics

1. Obtain help to lift a large load or student. Do not lift a load that is too heavy for you. *Good body mechanics allow movement and lifting of heavy objects or students without injury to the staff member or student. Therefore, if possible, plan to move a heavy object when help is available.*
2. Explain the procedure to the student at his/her level of understanding. Encourage the student to participate as much as possible.
3. When moving a heavy object or student:
 - Use proper posture at all times. Maintain lower back in good alignment while standing or sitting.
Proper posture decreases the chance of back injuries.
 - Secure as much additional assistance as is needed for safe moves.
 - If possible, pull it, push it, roll it, or lower it rather than lifting it.
Work with the force of gravity by pulling, pushing, rolling or lowering, rather than working against the force of gravity by lifting the load.
 - Stand close to the object or student to be moved.
Provides a good center of gravity and good balance for moving the load and an even distribution of weight.
 - Provide a broad base of support.
Have feet at least 12 inches apart with one foot slightly in front of the other.
 - **Keep back straight, knees and hips flexed, weight distributed on both feet, and shoulders in line with pelvis.**
Avoid twisting movement of the spine. Do not keep back rigid because it will lead to back strain and decrease flexibility.
 - Use as many muscle groups as possible for moving the object or student.
Leg and arm muscles reduce the workload on the back and support the load.
 - When working at lower levels, do not stoop by bending over. Instead flex body at knees, and keeping back straight, use thigh and gluteal muscles to accomplish task.
 - Breathe during the moving effort.
Breathing provides for good oxygenation of the muscles and prevents dizziness and injury.
 - To change the direction of the movement, pivot feet, turn with short steps, and turn the whole body without twisting the upper torso.
To lower an object or student, always bend straight down toward the resting place, never twist to lower an object or student. Lowering straight down prevents twisting sprains and injuries to the back.
 - Use a verbal count of 1-2-3 to coordinate movements with the student or the staff member assisting with moving the student or object.
Coordination of movements will prevent jerky movements, which could lead to back strain and injury.
 - Take rest periods to avoid straining.
4. When lifting a heavy object or student:
 - Squat

- Stand to lift
- Carry object close to body
- Carry using muscles that pull shoulder blades together
Lifting in this manner lessens back strain.

Sources:

Graff, J., Ault, M., Guess, D., Taylor, M., & Thompson, B. (1990). Therapeutic Management. In *Healthcare for Students with Disabilities, An Illustrated Medical Guide for the Classroom*. Baltimore: Paul H. Brookes Publishing, pp. 119-144.

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Potter, P.A., & Perry, A. G. (2001). *Fundamentals of Nursing*. (5th ed.). St. Louis: Mosby, pp. 990-996, 1004-1007.

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Principles of Good Body Mechanics. In *Manual of Nursing Procedures for South Carolina Schools*.

General Information for Students Who Require Assistance with Physical Mobility

Date: _____

To: _____ (Teachers, Instructional assistants,
Bus drivers, etc)

Name of Student: _____

This student uses one of the following devices to help with movement (please check):

- Cane
- Crutches
- Walker
- Prosthesis (a replacement for a missing limb)
- Brace or splint
- Cast
- Wheelchair
- Other _____

Students using one of these devices may need more time to move from one area to another.

They also may need the following physical assistance to avoid falls or to otherwise keep the student safe:

Contact _____ at _____ (phone
number/pager) for additional information or if the student experiences any problems when
using these devices.