

# **Chapter 4: 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 body part is altered or injured, the result can be a loss or change in the body's ability to move. Mobility impacts how a student can access the educational environment, and therefore, assessment and support of mobility is an important issue for school nurses and all educational personnel who work with children.

Positioning is an important consideration in maintaining optimal functioning. Not only does it impact mobility and access to education, it can reduce muscle tension, which can affect pain and the ability to concentrate on academics. Collaboration between the school nurse, health care provider, teachers, physical therapists, and occupational therapists can assist in determining the most appropriate positioning and assistive devices for students with special musculoskeletal needs.

Muscle movement and functioning may be altered by a number of causes. Injuries to an extremity can cause permanent or temporary loss of function. Damage to a portion of a student's brain may result in an interruption 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.

Routine daily activities help keep 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 can pull the joint into an abnormal position, creating a contracture. Contractures cause greater effort for movement, increased wear on the joints, and further decreased range of motion. Loss of normal muscle movement can make bones porous and soft.

Adaptive equipment (desk, chairs, and feeding equipment) and frequent movement can be used in assisting 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. All adaptive equipment and assistive devices, owned by the school division, should be checked for proper condition and function on a frequent basis per school division policy to ensure the safety of the student. Frequent use can cause wear and tear over time and lead to accidents or injuries. Devices that belong to the student and brought to school should be properly labeled. If maintenance or operational issues are identified, the parent or guardian should be notified before further use.

**Sources:**

Selekman, J. (2013). *School nursing: A comprehensive text*. (2nd ed.). Philadelphia: F.A. Davis, 1044-1045.

# 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. Mobility is important to students growth and development. Inactivity can lead to a decrease in the functional capabilities of body systems and ability of students to access their educational plan. The major consequences of impaired mobility are loss of muscle strength and endurance, bone demineralization, loss of joint mobility and contractures, increased workload on the heart, pooling of blood in the extremities, shallow respirations, decreased basal metabolic rate, decreased gastrointestinal motility, and nerve degeneration. Decreased mobility can also have a profound effect on children's development of independence, creativity, and sense of mastery. It is important to encourage students to be as active as their conditions allow.

## Settings and Staff

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 has contact with the student should be familiar with how to assist the student with movement and positioning.

Support of the student who requires assistive devices for ambulation can be administered by the school nurse, physical therapist, occupational therapist, family, instructional 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, use of assistive devices, potential problems, and appropriate lifting procedures and how to obtain assistance should problems occur.

## Individualized Health care Plan (IHP)

Each student's IHP must be tailored to the individual's needs. A sample plan is included in Appendix A. When preparing an IHP for a student who requires assistance with mobility, the following items should be considered:

- Student's underlying condition and possible problems associated with the condition.
- Student's baseline status (including skin condition, level of mobility).
- Health care provider's orders for mobility devices and mobility support.
- Type of physical mobility assistance student requires.
- Reason student requires the physical mobility assistance.
- Care and use of any assistive device.
- When assistive device is to be used.

Oklahoma Guidelines for Healthcare Procedures in Schools

- Transportation needs and plans.
- Standard precautions.

**Sources:**

Hockenberry, M., & Wilson, D. (2015). *Wong's nursing care of infants and children*. (10th ed.). St. Louis: Elsevier Mosby, 1547-1556.

Selekman, J. (2013). *School nursing: A comprehensive text*. (2nd ed.). Philadelphia: F.A. Davis, 1044-1045.

Smith, S., Duell, D. & Martin, B. (2012). *Clinical nursing skills: Basic to advanced skills* (8th ed.). Boston: Pearson, 335-337.

## Procedure for Positioning a Student

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 which 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 can help prevent back injury.
7. Change the student’s position as needed or as 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 who does not have 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
<b>Supine Position (on back)</b>	
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 hand roll if necessary.</i>

Position	Action
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>
<b>Lateral Position (on side)</b>	
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 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>
<b>Prone (on stomach)</b>	
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 hand rolls if necessary. Place small foam pads or pillows as needed under shoulders.</i>

Position	Action
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 or rub against 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 in the student’s log. Report any changes from student’s usual pattern to school nurse and family.

**Sources:**

Smith, S., Duell, D. & Martin, B. (2012). *Clinical nursing skills: Basic to advanced skills (8th ed.)*. Boston: Pearson, 348-353.

Wisconsin Improving School Health Services Project. (2015). *Transfer procedures*. Available online at <http://www.wishesproject.org/uaptraining>.



# Procedure for Assisting Student with a Cane

**Note: Equipment and supplies are provided by families.**

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. This offers the most support.
  - 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 but placed so that it is not a safety hazard for others).
- 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:**

Hockenberry, M., & Wilson, D. (2015). *Wong's nursing care of infants and children. (10th ed.)*. St. Louis: Elsevier Mosby, 1565-1566.

Selekman, J. (2013). *School nursing: A comprehensive text. (2nd ed.)*. Philadelphia: F.A. Davis, 1044-1045.

Smith, S., Duell, D. & Martin, B. (2012). *Clinical nursing skills: Basic to advanced skills (8th ed.)*. Boston: Pearson, 388-390.

Wilkinson, J.M., Treas, L.S., Barnett, K.L., & Smith, M.H. (2016). *Fundamentals of nursing: Vol. 2: Thinking, doing, and caring*. Philadelphia: F.A.Davis, 639-640.

## Procedure for Assisting a Student with Crutches

**Note: Equipment and supplies are provided by families.**

Crutches are one type of mobility device used when students cannot bear weight while walking, can only bear partial weight, or need support for balance while wearing braces. There are several different types of crutches and selection depends on the student's needs. Forearm crutches and trough crutches are most frequently used by students with varying degrees of paralysis who use them long term with braces for support in walking. A newer type of crutch is the leg support crutch or knee walker/knee scooter crutch. This "crutch" works best for injuries to the ankle or lower leg and looks much like a scooter with a seat for the affected leg. The most common type of crutch is the axillary swing-through crutch and the instructions below are primarily for this type of crutch.

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 of the student and 4-6 inches to the side (tripod position). The arm-piece of the axillary crutch should be 2-3 finger widths from the axilla.
5. Check the hand-piece. The hand-piece 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 axilla.
7. Check to make sure the crutches have intact rubber tips on the bottom for stability.
8. Make sure that the crutches have the student's name on them.
9. 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. This 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. This requires strength and balance because the arms must support all the body's weight. This 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; then left foot; then left crutch; then right foot.  
  
This gait is used by a student who can move each leg separately and can bear some 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.

10. 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 unaffected leg and crutches.
- Place both crutches on same level as feet.
- Advance unaffected leg while bearing down on crutches
- Pull affected leg and crutches while bearing weight on unaffected leg.

11. Teach student how to sit:

- Make sure chair is stationary or braced against wall. Stand in front of chair, facing forward.
- Place unaffected leg against chair.
- Hold crutches together in hand on affected side.
- Keep back straight and gently ease down supporting weight on crutches and unaffected leg.
- When almost seated, gently hold on to arm of chair and complete the movement.

12. 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.

13. Teach walking downstairs:

- Place both crutches on same level as feet.
- Shift weight to unaffected leg.
- Lower crutches to next step and bring the affected foot forward, but do not step down.
- Shift weight to crutches and step/hop down with the unaffected leg to step with crutches.

14. 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.

15. 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.

16. 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 but placed so that they are not a safety hazard for others).
- 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.
- It is usually beneficial to arrange for student to leave each class 5 minutes early to be out of the hall during regular changing of classes.
- Use elevator instead of stair walking whenever possible to decrease risk of accidents.

17. Document teaching and student's ability to walk with crutches.

**Sources:**

Hockenberry, M., & Wilson, D. (2015). *Wong's nursing care of infants and children. (10th ed.)*. St. Louis: Elsevier Mosby, 1565-1566.

Selekman, J. (2013). *School nursing: A comprehensive text. (2nd ed.)*. Philadelphia: F.A. Davis, 1044-1045.

Smith, S., Duell, D. & Martin, B. (2012). *Clinical nursing skills: Basic to advanced skills (8th ed.)*. Boston: Pearson, 391-397.

Wilkinson, J.M., Treas, L.S., Barnett, K.L., & Smith, M.H. (2016). *Fundamentals of nursing: Vol. 2: Thinking, doing, and caring*. Philadelphia: F.A.Davis, 639-640.

## Procedure for Assisting a Student with a Walker

**Note: Equipment and supplies are provided by families.**

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. A newer type of walker is a "knee walker" which can be used in place of crutches for a lower leg or ankle injury. It looks much like a scooter with a seat for the affected leg.
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. (If the walker does not have wheels, it should be picked up instead of sliding it).
  - 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 but placed so it is not a safety hazard for others).
  - 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.

### **Sources:**

Hockenberry, M., & Wilson, D. (2015). *Wong's nursing care of infants and children. (10th ed.)*. St. Louis: Elsevier Mosby, 1565-1566.

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Wisconsin Improving School Health Services Project. (2015). *Transfer procedures*. Available online at <http://www.wishesproject.org/uaptraining>.



# Procedure for Assisting a Student with a Wheelchair

**Note: Equipment and supplies are provided by families.**

1. Assess the need for assistance with a wheelchair at school.  
*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 everywhere the student needs to go in the school is fully wheelchair accessible. Provide student with precautions regarding most accessible routes.
5. Teach and assist the student to monitor for skin irritations and pressure areas. Students with compromised sensation may have pressure relief cushions or adaptations. Monitor for rubbing and skin irritation as student grows.
6. 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.*
7. Teach and assist the student to move to a standing position as appropriate:
  - Lock wheelchair wheels.

- Make sure student can bear weight. Allow student to help as much as possible.
  - Instruct student to move to edge of cot or chair with hands on chair arms or cot edge.
  - 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 cot 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, and then pivot the student slowly until he/she is seated in the chair.
8. 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.*
9. Recharge batteries on motorized chairs or scooters each day according to battery manufacturer's directions.
10. 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.*

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. Assess transportation of the student and wheelchair between home and school. *Whenever possible, student should be transferred from a wheelchair to an appropriate federally-approved child/occupant restraint system when being transported. If transportation in a wheelchair is necessary, the student should be transported facing forward and only in vehicles that can be adapted to secure a wheelchair. Ones using a lap and shoulder belt that can be secured to the vehicle and a 4-point strap tie down system are preferable. Vehicle drivers, teachers, aides, nurses, and monitors should be able to demonstrate the ability to correctly use whatever restraint system is used and know what to do in an emergency.*
13. 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.*
  - 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.*
  - Never tilt chair far back, turn sharply, or stop rapidly.
14. 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.*
15. Document teaching and review student safety points.

**Sources:**

Hockenberry, M., & Wilson, D. (2015). *Wong's nursing care of infants and children. (10th ed.)*. St. Louis: Elsevier Mosby, 1566-1567.

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Wisconsin Improving School Health Services Project. (2015). Transfer procedures. Available online at <http://www.wishesproject.org/uaptraining>.

## Assisting a Student with a Prosthesis

**Note: Equipment and supplies are provided by families.**

1. Assess the need for assistance for the prosthesis—an artificial extension that is a replacement for a body part, such as an artificial limb or an artificial eye.  
*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 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 and any protective clothing.
  - Encourage student/family to keep prosthesis clean.
  - Newer prosthesis may be myoelectric devices and require monitoring of proper function.
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. If possible, 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.

## Possible Problems for a Student with Prosthesis

- **Inflamed joint**  
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.
- **Reddened area on the skin under prosthesis**  
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.
- **Too small or ill-fitting equipment**  
Notify school nurse, family and/or health care provider.
- **Joint contracture**  
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.

### Sources:

- Bowden, V., & Greenberg, C. (2012). *Pediatric nursing procedures (Third ed.)*. Philadelphia: Wolters Kluwer Health/Lippincott Williams & Wilkins, 604-605.
- Hockenberry, M., & Wilson, D. (2015). *Wong's nursing care of infants and children. (10th ed.)*. St. Louis: Elsevier Mosby, 1563-1566.

## Assisting a Student with an Orthosis

**Note: Equipment and supplies are provided by families.**

1. Assess the need for assistance for the orthosis or orthotic—an orthopedic device that is used to support a body part. It may be called a splint or a brace. Other examples include shoe lifts and cranial molding helmets. Specific orthoses describe the area of the body they treat and are often abbreviated. For example, the ankle-foot orthoses are referred to as AFOs, knee-ankle-foot orthoses as KAFOs, and thoracolumbosacral orthoses as TLSOs.

*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 clothing 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 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.*

## Possible Problems for a Student with an Orthosis

- **Inflamed joint**  
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.
- **Reddened area on the skin under orthosis**  
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.
- **Too small or ill-fitting equipment**  
Notify school nurse, family and/or health care provider.
- **Joint contracture**  
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.

### Sources:

- Bowden, V., & Greenberg, C. (2012). *Pediatric nursing procedures (Third ed.)*. Philadelphia: Wolters Kluwer Health/Lippincott Williams & Wilkins, 604-605.s
- Hockenberry, M., & Wilson, D. (2015). *Wong's nursing care of infants and children. (10th ed.)*. St. Louis: Elsevier Mosby, 1563-1566.

# Procedure for Cast Care

**Note: Equipment and supplies are provided by families.**

1. Assess why the student received a cast. Casts are typically applied to injured limbs to immobilize them and allow bones, ligaments, tendons, or muscles to heal.  
*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—to include fiberglass or mixture of polypropylene, nylon and polyester. These are the most common casting materials used with children as they are lightweight, durable, and available in colors and prints. Material may or may not be water proof. Prolonged wear or demanding activities may lead to cracks or splits in the cast causing skin irritation or damage.
  - 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 the extremity can be evaluated by viewing his/her response to touch and asking him to wiggle toes/fingers. 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 family and/or health care provider of any pain, color change, pressure, numbness, or decreased sensation in affected body part. Observe for skin rashes or reddened areas around the cast. Notify 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. If a student has a cast which borders the perineal area, do **not** cut a diaper to fit the area because the raw areas of the diaper give off debris that can get under the cast and irritate the skin.  
*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. 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. (Some references recommend rubbing the skin with isopropyl alcohol (70%) four times a day to toughen the skin. However, no scientific data could be found to support this practice). **Do not** use alcohol on red or irritated skin.
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. Pad cast edges with adhesive tape or moleskin may decrease skin irritation and protect the edges of the cast. Do not put padding in cast.  
*Padding such as cotton or tissues may fall down in cast and decrease circulation.*
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. If needed, 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. Assess transportation needs of the student between home and school. *Some casts may make it difficult to secure the student in an appropriate restraint system. Special vests, such as the E-Z-On Vest, and car safety seats have been designed for transport and some health care facilities may have these available for loan. Vehicle drivers, teachers, aides, nurses, and monitors should be able to demonstrate the ability to correctly use whatever restraint system is employed and know what to do in an emergency.*
15. If needed, 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.*

16. Document care and findings on student log.  
*Notify school nurse, family and/or health care provider of any problems, changes, or concerns.*

**Sources:**

- Bowden, V., & Greenberg, C. (2012). *Pediatric nursing procedures (Third ed.)*. Philadelphia: Wolters Kluwer Health/Lippincott Williams & Wilkins, 166-175.
- Gockley, A., Hennikus, W., Lavin S.T., Rzucidlo, S, and Rieghard, C. (2015). *Transportation of children in spica casts in the USA*. Journal of Pediatric Orthopedics, 277-280. Available online at <http://www.ncbi.nlm.nih.gov/pubmed/26018926>.
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- Smith, S., Duell, D. & Martin, B. (2012). *Clinical nursing skills: Basic to advanced skills (8th ed.)*. Boston: Pearson, 1017-1022

## Problems that May Occur with Casts

**Presence of pain greater than expected, decreased or absent movement, pain with stretching toes or fingers, or decreased sensation in the affected extremity.**

These are indicators of pressure build-up under the cast. Pressure decreases circulation to the 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.

- **Damaged cast**  
Immobilize extremity and notify school nurse, family, and health care provider of the extent of the damage.
- **Plaster of Paris cast becomes wet or soiled**  
Allow to air-dry. If wet area is large or cast is soiled, contact school nurse or family.
- **Cast too tight**  
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. This 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.
- **Pain or gestures of pain**  
This 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.
- **Drainage on cast or odor from cast**  
This 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 for assessment.

**Sources:**

- Bowden, V., & Greenberg, C. (2012). *Pediatric nursing procedures (Third ed.)*. Philadelphia: Wolters Kluwer Health/Lippincott Williams & Wilkins, 166-175.
- Gockley, A., Hennikus, W., Lavin S.T., Rzucidlo, S, and Rieghard, C. (2015). *Transportation of children in spica casts in the USA*. Journal of Pediatric Orthopedics, 277-280. Available online at <http://www.ncbi.nlm.nih.gov/pubmed/26018926>.
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## Procedure for Principles of Good Body Mechanics

1. Determine the need for assistance in moving or turning a student. Obtain help to lift a large load or student. Do not lift a load that is too heavy for you.  
*Good body mechanics can assist in moving and lifting of heavy objects or students while minimizing injury to the staff member or student. However, additional personnel and/or assistive devices may be required in the safe movement of students or heavy objects. **The National Institute for Occupational Safety and Health (NIOSH) recommends that the average worker avoid lifting more than 50 pounds without assistance, and evidence-based practice research indicates that injuries are minimized if workers use assistive devices to lift more than 35 pounds.***
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.*
  - Assess the need for assistance and secure as much additional assistance as is needed for safe moves. *This may involve using the assistance of other personnel or the use of assistive devices. Many assistive devices are available for help in moving students and their use should be explored when developing an individualized health plan to assist in the student's mobility. Transfer belts, transfer boards, and items such as transfer sheets are simple items that can be helpful in moving students.*
  - 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. *This 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.**  
*Flexing knees allows strong muscles of the legs to do the work of lifting. 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. Move the hip and shoulders as one unit.

*Leg and arm muscles reduce the workload on the back and support the load.*

- Avoid leaning and stretching. 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:

- Assess need for assistance.
- 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:**

National Institute for Occupational Safety and Health. (2010). *Safe patient handling training for schools of nursing*. Center for Disease Control and Prevention. DHHS (NIOSH) Publication # 2009-127.

National Institute for Occupational Safety and Health. (2010). *Strains, sprains, and pains in home health care: Working in an uncontrolled environment*. NIOSH Science Blog. Available online at [http://blogs.cdc.gov/niosh-science-blog/2010/04/16/homehealth care/](http://blogs.cdc.gov/niosh-science-blog/2010/04/16/homehealth%20care/).

Selekman, J. (2013). *School nursing: A comprehensive text. (2nd ed.)*. Philadelphia: F.A. Davis, 1045-1047.

Smith, S., Duell, D. & Martin, B. (2012). *Clinical nursing skills: Basic to advanced skills (8th ed.)*. Boston: Pearson, 336-347.

**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 or more 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 or special devices to avoid falls or to otherwise keep the student safe:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

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