Contractures

Joint movement is similar to the hinge on a door. Regularly moving the door keeps it working properly, so the door opens and closes easily. When the door isn’t moved regularly, the hinge may rust from lack of use, making the door harder to open and close. Similarly, the structures in and around the joints stretch, flex, and move all day long, keeping them functional. If the joint is not moved, it shrinks, becomes stiff, and loses the ability to stretch and move. This causes changes in the fluids that lubricate the inside of the joint. Movement squeezes and pushes the fluids around, lubricating the joint. When a joint stops moving, so does the fluid. Now both the outside and inside of the joint are immobile.

Contractures are joint deformities caused by immobility. Each muscle has an “opponent” muscle that works in the opposite direction. If a muscle or group of muscles is not moved or body alignment is not maintained, the stronger muscles take over. The muscles used for flexion are much stronger than those used for extension. A contracture causes the muscle fibers to pull inward (flexion) and tighten because the resident cannot move them regularly. Connective tissue shortens intersecting points, limiting range of motion (ROM).

Joint mobility assessment

To know if nursing care is effective, we must know the resident’s baseline function. Assessing joint ROM is important. The restorative nurse or therapist will measure the residents’ ROM on admission and quarterly after that. Some facilities use forms with pictures that show degrees of joint mobility so screeners can compare the resident’s joint mobility with that in the picture. If the angle of mobility is abnormal, the resident will be referred to therapy for follow-up joint measurement with an instrument called a goniometer and possible intervention.

The importance of early identification

When muscles are weak, contractures place them in a position of mechanical disadvantage. Weakness and muscle wasting from lack of use is called atrophy. Residents who have contractures always have a high risk for developing more contractures. Those with paralysis, spasticity, and diseases of the nervous system are also at risk. Research has shown that nursing home residents are eight times more likely to develop contractures than people living in the general community.

Contractures can begin to form in as little as four days of immobility. After 10 days, they become significant. After 14 days, they are severe
and deformities are evident. For each day after day four, it will take 10 or more days of therapy to restore the joint to a functional state, but normal ROM may never return. When you do the math, 14 days of contracture will take at least 100 days of treatment for recovery.

As you can see, even early contractures need months or years of care. If contractures are identified before the joint is completely immobile, they can usually be reversed. A resident with non-fixed contractures has some ROM in the joint. If a fixed contracture is present, the resident has no movement. Contractures also occlude the capillaries in the joint. The relationship between contractures and pressure ulcers may be as high as 60%.

**Prevention and treatment**

Keeping residents active and moving is the best way to prevent contractures. Exercising a joint several times each day is much better than exercising it once for a long time. If a resident is at risk, use restorative care to prevent contractures. This involves putting the resident in a position of function (i.e., the normal anatomic position of the body) as this is how the body works best. Inability to assume a position of function is a red flag that suggests a contracture or nerve, muscle, or tendon injury.

Pillows, props, splints, footboards, and supportive devices may also be used to maintain good body alignment.

Foot drop, which causes the joint to move away from the body (in extension), is an example of a contracture that can be helped by such devices. In this case, the foot drops until the toes point forward. The feet become fixed in a painful position called plantar flexion, and the contracture will continue to worsen if the joint is not supported. The resident cannot stand, walk, wear shoes, or place the heels flat on the floor. Footboards and other supports are essential for preventing plantar flexion.

To help alleviate the symptoms of foot drop, some CNAs make a toe pleat at the foot when making the bed. To make a toe pleat, stand at the foot of the bed, and pull the top sheet straight up at the bottom of the mattress, where the feet go. Fanfold the top sheet about 2–4 inches, forming a pleat to make room for the feet.

To treat existing contractures, such as foot drop, you will work closely with the therapist and restorative nurse. Contractures resulting from immobility respond best to slow, gentle stretching and massage. If this is necessary, a therapist will supervise care and make recommendations for the restorative program. Contractures caused by trauma or surgery form scar tissue containing thick collagen fibers, but there are no collagen fibers in immobility contractures. Because of this, treatment differs. Contractures with collagen fibers can be surgically released.

**Splinting**

A splint is a type of orthotic device that supports or corrects musculoskeletal deformities or abnormalities. Splinting can be a beneficial way to prevent and treat contractures, as well as to alleviate other joint problems. The physical or occupational therapist will order or make a splint to treat the condition and will be highly involved if splinting is ordered. The physician will decide at which times the splint is to be worn. Splints are used to:

- Improve alignment
- Prevent skin breakdown
- Prevent deformities and contractures of the joints
- Protect the joints during activities
- Promote healing
- Support and stabilize joints
- Position joints in good alignment during rest
- Relieve muscle strain around weak joints
- Relieve pain
- Maintain and improve mobility and ROM
- Increase ability to use arms and legs functionally

Before applying the splint:

- Monitor for swelling, bruising, and skin irritation
- Be sure the skin is clean and dry
CONTRACTURES AND SPLINTING

- Perform ROM exercises to decrease tone
- Clean the splint, if needed

To clean the splint:
- Wash with soap and lukewarm water, scrubbing with a small brush, if needed
- Rub alcohol on the inside to reduce odor
- Press Velcro straps together during washing
- Hand wash the Velcro straps and stockinette with lukewarm, soapy water
- Let it air dry
- Avoid heat sources such as direct sunlight or a heater

Splints are custom-fit. Never interchange splints between residents. A splint that fits correctly:
- Should look like it is molded to fit the joint
- Does not dig into or rub against the skin
- Will keep the joint in good alignment
- Will be snug, but not tight
- Will allow you to fit one to two fingers between the splint liner and the skin, and between the strap and the skin
- Is fastened correctly

To care for and monitor assistive devices:
- Be sure you understand how to apply and care for the device and that you are permitted to apply it.
- Follow instructions for use of the device.
- Apply the device according to the resident’s plan of care.
- Keep the device—and the skin under the device—clean and dry.
- Keep nails short and clean. If you are not permitted to provide nail care or if the resident is a diabetic, consult the nurse.
- Check the device for rough edges, cracks, or tears. Pad the device to protect the skin or notify the restorative nurse if the device needs modification or repair.
- Check the device for breakage, loose or missing parts, deterioration, and wear and tear. If you identify a problem, check with the restorative nurse before proceeding.
- Pad and protect bony prominences.
- Inspect the skin for red and open areas before applying the device. If present, notify the nurse.
- Support the extremity when applying and removing the device. Avoid unnecessary pulling, twisting, or rubbing.
- Report signs of skin irritation, such as redness, pain, abrasions, or breakdown.
- Monitor the area for signs of impaired circulation, such as numbness, tingling, cyanosis, color or temperature changes, or edema. Inform the nurse promptly if noted.
- Check the skin after the device is removed. Notify the nurse if the resident complains of pain or you observe signs of pressure, red or open areas, blisters, edema, cyanosis, irritation, temperature changes, or other problems in the area of the splint.

Static splints
A static splint is used to stabilize a joint to prevent motion. There are no movable parts. The splint supports and immobilizes the joint during healing and maintains it in a position of function. A static splint also helps relieve pain and prevent and correct deformities and contractures. It prevents weak or injured muscles from being overstretched. A static splint is used on a short-term basis and only when a dynamic splint would not produce a better outcome. Long-term use will result in joint immobility.

Dynamic splints
A dynamic splint is the splint of choice when trying to gain joint motion. This splint moves with the resident. A spring or elastic band creates tension, causing the joint to move in the desired direction. The therapist will reposition the splint gradually to get a greater degree of stretch. The wear schedule is ordered by the physician or therapist.

Editor’s note: This issue of CNA Training Advisor was adapted from The Long-Term Care Nursing Assistant’s Guide to Advanced Restorative Skills, written by Barbara Acello, MS, RN.
**CONTRACTURES AND SPLINTING QUIZ**

Mark the correct response.

<table>
<thead>
<tr>
<th>Name:</th>
<th>Date:</th>
</tr>
</thead>
</table>

1. When contractures occur, what happens?
   a. Muscle fibers of the stronger opponent muscle extend outward and loosen
   b. Muscle fibers of the stronger opponent muscle pull inward and tighten
   c. The weaker opponent muscle takes over
   d. The opponent muscle groups work together

2. Why is regular assessment and monitoring of a resident’s joint mobility important?
   a. It allows long-term care providers to track the effectiveness of nursing care and treatment
   b. If residents’ angles of joint mobility are abnormal, they will need to be referred to therapy for further tests and possible intervention
   c. The conditions of residents’ joints may change rapidly, so consistent monitoring can help providers spot early signs of contractures and quickly intervene
   d. All of the above

3. Which of the following conditions does NOT put a resident at greater risk for contractures?
   a. Preexisting contractures
   b. Paralysis
   c. Diseases of the glandular system
   d. Diseases of the nervous system

4. How quickly can contractures form if a resident is immobile?
   a. In 2 days
   b. In 4 days
   c. In 10 days
   d. In 14 days

5. Exercising a joint several times each day is less effective than exercising it once a day for a longer period of time.
   a. True
   b. False

6. Why does treatment differ between contractures resulting from immobility and those caused by trauma or surgery?
   a. There are no collagen fibers in immobility contractures
   b. There are no collagen fibers in contractures from surgery or trauma
   c. Unlike contractures caused by trauma or surgery, those resulting from immobility don’t respond well to gentle stretching and massage
   d. None of the above

7. Which of the following are splints NOT used for?
   a. Restraining residents
   b. Preventing skin breakdown
   c. Maintaining and improving mobility and range of motion
   d. Increasing ability to use arms and legs functionally

8. Which of the following is a step in the splint cleaning process?
   a. Washing the device with soap and cold water
   b. Rubbing alcohol on the inside of the device to reduce odor
   c. Ensuring Velcro straps are separated while washing
   d. Placing the device in direct sunlight to dry

9. Interchanging a splint between residents is acceptable as long as you clean the device thoroughly beforehand and the residents are similar in size.
   a. True
   b. False

10. What are static splints used for?
    a. Enabling joint motion
    b. Stretching weak or injured muscles
    c. Long-term joint support
    d. Stabilizing a joint to prevent motion