

# Nursing Care and Management of a Patient with a Halo Device

Neurosurgery Education  
and Outreach Network **NEON**

Neurosurgery Education (NEON)  
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# Neurosurgery Education and Outreach Network (NEON)

## **The Neurosurgery and Education Outreach Network (NEON)**

The Neurosurgery Education and Outreach Network (NEON) is comprised of Neurosurgical Nurse Educators (NNEs), Clinical Outreach Specialists/Advanced Practice Nurses, and Hospital Administrators dedicated to the neurosurgical nursing program implementation and on-going educational and clinical support of nursing staff in the neurosurgical centres and the non-neurosurgical referral centres.

As a neurosurgery education support program, NEON reports to the System Capabilities Working Group, a sub-group of the Provincial Neurosurgery Advisory Committee, which supports system-wide improvements for Ontario's neurosurgery services. NEON also works in collaboration with Critical Care Services Ontario (CCSO).

### **Disclosure Statement**

The Neurosurgery Education and Outreach Network (NEON) has no financial interest or affiliation concerning material discussed in this presentation.

This presentation provides direction for how to provide nursing care to adult patients with a Halo Device to ensure consistency within and across organizations. It was developed by a sub-group of clinical neurosurgical nurses and neurosurgical educators for nurses across Ontario. This presentation is not meant to be exhaustive and its contents are recommended, but not mandated for use. Nurses should use their clinical judgment and utilize other assessment parameters if determined necessary.

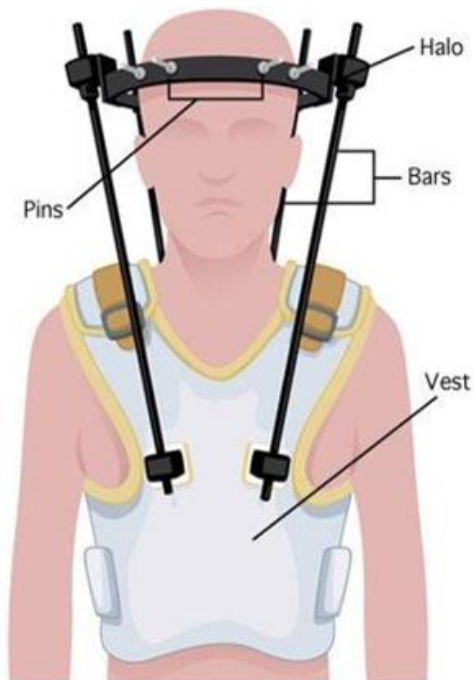
## Learning Objectives

The learner will be able to:

- Explain what a halo device is;
- Describe the implications for a halo device;
- Summarize the potential risks and complications associated with a halo device;  
and
- Understand the nursing interventions related to caring for a patient with a halo device.

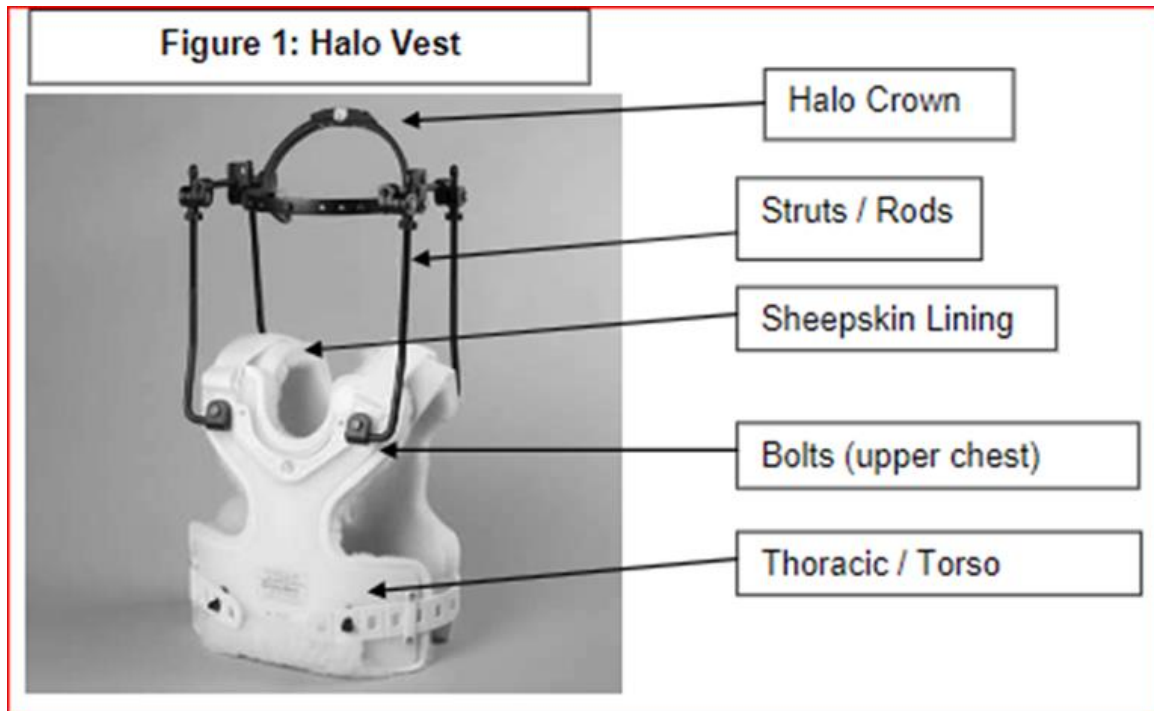
### Halo Device

- Used to immobilize the cervical spine in the treatment of traumatic injuries to the cervical spine or for post-operative support.
- Reduces the risk of damage to the patient's spinal column when the vertebrae are unstable due to either a dislocation or fracture of the bones.
- Also referred to as a “halo vest” or “halo.”

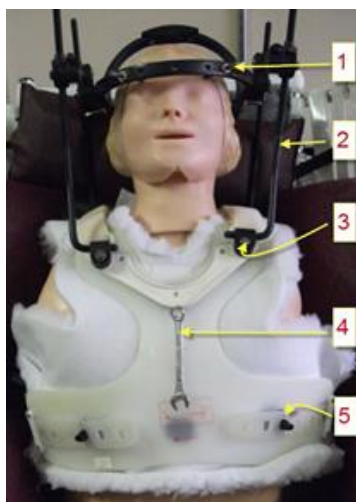


Picture retrieved online from: <http://178.128.108.15/halo-orthosis-immobilization-spine-orthobullets.html>

### Halo Parts



Picture taken from The Ottawa Hospital Nursing Policy



1 – Skull pin on halo ring

2 – Strut / rod

3 – Bolt

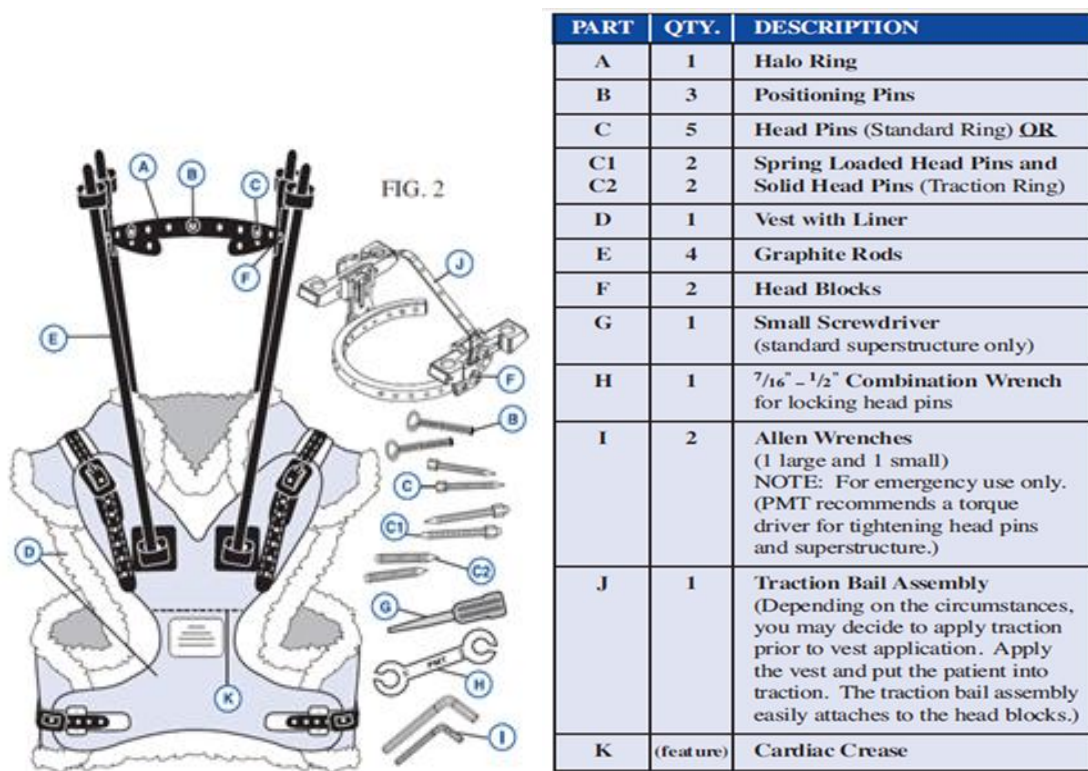
4 – Wrench or Allen key

5 – Strap / buckle

Picture retrieved online from  
<https://www.saskatoonhealthregion.ca/about/NursingManual/1052.pdf>

**\*\*Sheepskin liner is worn under the vest to protect the skin**

## The PMT® Halo system





### Description of the Parts of a Halo Device

**Halo Crown** - A graphite ring attached to the skull with four stabilizing pins (2 anterior & 2 posterior), which are threaded through the holes in the ring. The screws are inserted into the outer layer of the skull, 1 mm into the periosteum. The ring is attached by metal or carbon fiber uprights to a jacket vest around the patient's chest.

**Halo Vest** – The plastic jacket vest lined with a soft synthetic sheepskin. It has shoulder and thoracic straps. The vest holds the halo ring in place with the upright and transverse attachment bars and distributes the weight of the patient's head to their chest.

**Halo vest wrench or Allen key** - A 7/16 wrench is supplied with the vest and it is used to tighten or loosen the clamp bolts on the vest and the locking nuts on the crown. Only the attending surgeon or trained delegate in halo device application and maintenance can adjust the clamp bolts or locking nuts. The wrench or Allen key must always be attached to the front of the vest for CPR.

**\*The Halo device is MRI compatible \*\***

## Assessment of the Halo Device

### Integrity & Function

1. Examine the halo device for stability, secure connections, and positioning.
2. Inspect each pin/bolt for loosening - ensure they are secure and tight; report loosened pins to the physician. Assess for loosening of the pins.
  - Signs that a pin may be loose: Redness, swelling or discharge at the pin site OR a clicking noise that only the patient can hear. If there is a noise the caregiver can hear, the external pieces may need to be tightened by a trained delegate. The pins should not cause pain after the first few days, so if the patient starts complaining of one pin site hurting more than the others, it is probably loose.
3. Ensure that the wrench is fastened to the vest for emergency intervention.
4. Check the fit of the vest.
  - With the patient in a supine position, you should be able to insert two fingers under the vest at the shoulder and chest.
5. Ensure that the sheepskin liner is clean and dry.
6. Check the halo vest for loose straps or screws, dirt, odour, or evidence of the need to repair the vest.
7. Never use the halo ring or vest to lift or reposition the patient.

### **Patient Assessment & Nursing Interventions**

- Changes in the neurological assessment could indicate spinal cord trauma, which would require immediate intervention.
- The vest limits chest expansion, which could lead to complications or alterations in respiratory function, such as reduced vital capacity, respiratory distress, atelectasis, and pneumonia.
  - Respiratory complications are more common in the elderly population.
  - The elderly are at higher risk for respiratory failure and cardiovascular collapse.
- Pulmonary embolus is a common complication associated with spinal cord injury.
  - Implement interventions such as mobilization, medication, etc. to decrease the possibility of thrombus or embolus formation.
  - Identify potential problems so that treatment can be initiated.
- Identify a patient at high risk for aspiration and the need to modify oral intake.
  - Assess for difficulty swallowing and risk for aspiration. Difficulty swallowing is usually due to placement of the head and neck in hyperextension. Readjustment of the halo device may solve swallowing problems.

### Pin sites

1. Monitor and assess pin sites each shift for redness, tenting of the skin, edema, and prolonged or purulent drainage. Monitor body temperature.
2. Provide meticulous pin site care. Clean each pin site each shift with a sterile applicator (gauze) dipped in Normal Saline or other solution as per order.



<https://assets.ossur.com/library/18099/ReSolve-Halo->



Taylor's Clinical Nursing Skills A NURSING PROCESS APPROACH Third Edition

## Skin

1. Assess the skin at the edges of the vest; inspect around and under the vest for redness or abrasions, especially over bony prominences. Keep all areas of skin dry. May use a flashlight to thoroughly inspect under the vest and around the pin sites.
2. Place over vulnerable areas a transparent dressing, a hydrocolloid dressing, or a foam dressing to prevent skin breakdown on prominent body areas, such as the shoulder.

## Muscle Function & Skin Sensation:

### - Identify neurologic deficits:

- Assess if the patient's neurological function is intact, if mobility and sensation are maintained, and if the patient will be able to ambulate in the halo device.
- Notify the physician immediately when there is a decrease or loss of motor function or sensation. The nurse should increase frequency of assessment while acute changes are happening.

## Ambulation & Positioning

1. Encourage ambulation, maintain proper body alignment, and prevent injury.
  - The brace can be cumbersome for patients, thereby decreasing their range of motion (ROM) and ability to ambulate.
2. While in bed, turn the patient every 2 hours.
3. Provide for ROM exercises for all extremities as necessary.
4. Assess patients when ambulating. The weight of the halo alters a patient's balance. Dural puncture can happen following trauma to the halo ring.



Össur (2010). Patient Information Manual. Retrieved from <https://assets.ossur.com/library/18099/ReSolve-Halo-Patient-Information-Manual.pdf>

## Turning and Repositioning

1. Teach your patients to turn slowly, in small increments, to avoid losing their balance.
2. Remind them to avoid bending forward because the extra weight of the halo device could cause them to fall. Have them bend at the knees rather than at the waist.
3. When patients are stable and independent, they can get out of bed on their own.
  - In these instances, patients should not do a “sit up” from a position lying on their back. Patients should instead roll onto their side, swing their legs over the edge of the bed, and use their arms as levers in assisting them to sit up.



DePuy Spine (2005). Bremer Halo System®

### Activity Level

1. Resume activity as indicated by the physician.
2. If able to resume full activity, patients should avoid heavy lifting (i.e., no weight lifting) or pulling oneself up by the waist.
3. Patients cannot drive a vehicle.
4. To get into a vehicle (as a passenger), patients should sit first, then lean forward and swing their legs into the car.
5. Patients should move their eyes instead of moving their head to compensate for restricted head and neck movement.



Össur (2010). Patient Information Manual. Retrieved from <https://assets.ossur.com/library/18099/ReSolve-Halo-Patient-Information-Manual.pdf>



## Summary of Complications

### Complications associated with use of a halo device include:

- Pin loosening;
- Pin-site bleeding;
- Pin-site infection;
- Discomfort secondary to pins;
- Scars after pin removal;
- Dysphagia;
- Dural puncture (following trauma to the halo ring);
- Skin breakdown - pressure sores secondary to vest irritation;
- Reduced vital capacity; and
- Psychological trauma.

## Hygiene

### Skin Care & Bathing

1. Wash the patient's chest and back daily; while avoiding *putting stress on the Halo vest or crown.*

- a) This will require the assistance of another person.
- b) Position patient flat on his/her side in good alignment (**patient must not move**).
- c) Undo one side strap of the vest- **only if approved by Surgeon** - (one side should always be securely buckled).

**Note: If the buckle position on the straps have not been marked, mark them before you undo them.**

- d) Inspect skin integrity.
- e) Place an incontinent pad/towel against the sheepskin to prevent the sheepskin from getting wet, then with a damp washcloth, wash the torso.
- f) Dry the skin thoroughly. **Do not apply lotions or powders under the vest.**
- g) Reconnect the strap to the proper notch (**if permitted**), then turn the patient to the other side and repeat the procedure.

**Note: If it is very difficult to pass a towel between the vest and skin, the physician, orthopaedic technician, or alternate trained in halo vest application should be notified to reassess fit.**

- Some organizations/surgeons may not allow nursing to undo the strap/buckle of the vest.

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- In this case, nursing would need to continue the washing/bathing procedure with the buckle(s) intact, as shown in the pictures below.



DePuy Spine (2005). Bremer Halo System®

- h) Remind the patient to avoid scratching under the vest. Doing so may disrupt skin integrity.

**\*\*Clinical Alert:** *Avoid the use of lotions or powders underneath the vest. A cotton pillow case or undershirt can be placed under the vest for comfort and absorption of perspiration; change this item daily.*

## Washing Hair

1. Shampoo the patient's hair regularly.
2. Place the patient supine in bed with an incontinent pad/towel along the back and shoulders of the halo vest to protect the lining from getting wet.
3. The halo crown, pins, and bars can all safely get wet.



<https://assets.ossur.com/library/18099/Resolve-Halo-Patient-Information-Manual.pdf>



DePuy Spine (2005). Bremer Halo



<https://vch.eduhealth.ca/PDFs/FB/FB.707.H162.pdf>

## Clothing / Dressing

1. Alterations to the patient's clothes may be necessary.
2. Dress patient in a sitting position.
3. T-shirts can be put on by helping the patient step into them (if able), following some alterations to the shoulder area.
4. It is easier for patients to wear loose fitting clothing over the halo brace (e.g., sweatshirts, hoodies, v-neck t-shirts).



DePuy Spine (2005). Bremer Halo System®

5. For female patients, it may be easier to wear a tube top, bikini top with neck drawstring, or strapless bra.
6. Patients should wear slip on shoes that are supportive, with no heels, and have rubber soles.
7. A cotton undershirt may be worn under the halo vest lining to absorb moisture.



Photo retrieved online from: <http://november29.typepad.com>

## Sleeping

1. Patients can sleep in any position that is comfortable for them.
2. Patients can sleep with or without a pillow under their head.
  - A small pillow rolled up towel, or a wedge of foam between the patient's head and the surface of the bed can be placed for more support.



DePuy Spine (2005). Bremer Halo

## Eating

1. Have the patient eat in an upright position.
2. Use a towel to protect the top part of the halo vest, to prevent the dropping of food/liquids into the vest.
3. Ensure the patient's meal is within easy access; assist with meal prep as necessary.
4. Encourage the patient to take smaller bites and chew food thoroughly.
5. Assess DAT – it may be easier for the patient to eat soft/liquid foods while wearing a halo device.



<https://timelessbeauty.wordpress.com/tag/halo-vest/>

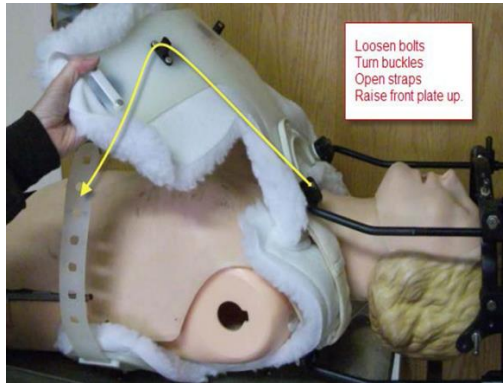
### **\*\*Clinical Alert:**

- Contact physician if chewing and/or swallowing becomes painful and if pain persists.
- Remind patients to NEVER consume any alcohol while wearing a halo device. Alcohol can interact with any medications that they may be taking and increase the chance of falls.



## Cardiopulmonary Resuscitation (CPR)

### How to open the halo vest of the Bremer system to perform CPR



Pictures retrieved online from: <https://www.saskatoonhealthregion.ca/about/NursingManual/1052.pdf>

### Once you have opened the halo vest....

- To prevent subluxation of the cervical injury, perform a jaw thrust to open the airway, which avoids hyperextension of the neck.
- Pull the patient's mandible forward while maintaining proper head and neck alignment.
- This position pulls the tongue forward to open the airway.

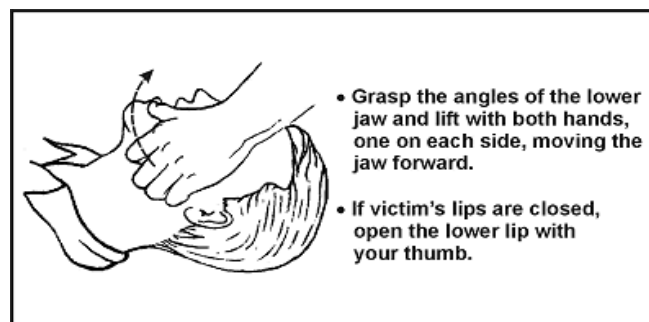


Photo retrieved online: [https://danger.mongabay.com/survival/afm/sections/4-open\\_airway\\_and\\_maintain.html](https://danger.mongabay.com/survival/afm/sections/4-open_airway_and_maintain.html)



## How to open the halo vest of the PMT system to perform CPR:

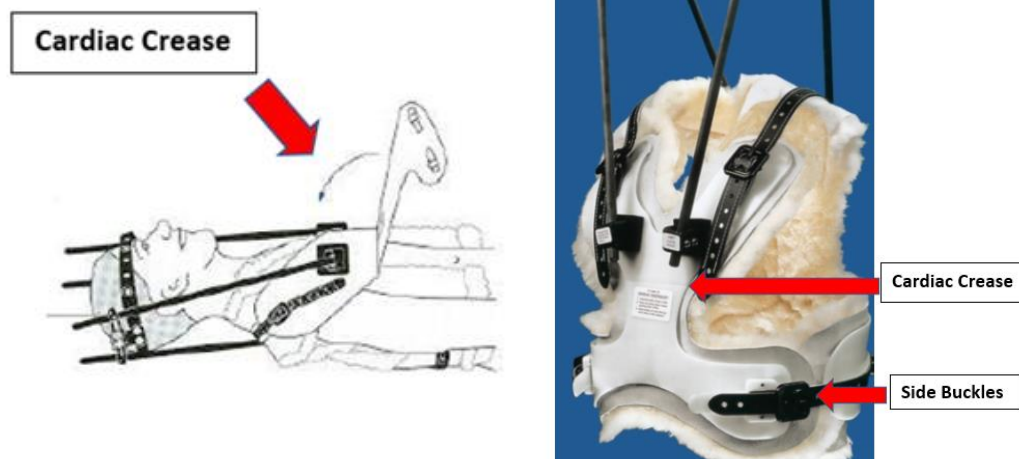


PMT Corporation (2004). PMT® Halo System™

To perform CPR:

1. Unbuckle waist straps & tabs
2. Place one hand above crease pushing down firmly
3. Bend bottom of vest front up until chest is fully exposed (See Cardiac Crease pictured below)
  - a. The back portion of vest and superstructure will stabilize patient as CPR is performed

\*After CPR, the vest will not provide support any more. A new vest must be used.



### Do's and Don'ts

Do's	Don'ts
Halo wrench or Allen key must be affixed to the front of the vest at all times in the event that CPR must be performed.	Do not tighten the pins if loose; only the surgeon or a trained delegate can do so. If loose, contact the physician immediately.
Log roll the patient when in bed until spine stability has been confirmed by the surgeon.	Do not remove the Halo vest or crown. Only trained staff or the surgeon can do so or if needed for CPR
Keep the sheepskin dry.	Do not get the sheepskin wet.
	Do not grab the bars when turning or moving the patient.
May use soap to wash the skin, but rinse and dry well.	Do not use lotions or powders under the vest.

### Length of Time a Halo is Worn

1. Most patients wear the halo vest for about 12 weeks.
2. The surgeon will determine the length of time that the halo must be worn.
3. The patient will have CT scans or X-rays before the vest is removed to make sure that the bone has healed properly.
4. It is a quick procedure to remove the halo and causes very little discomfort.
5. The patient may be fitted with a collar once the halo is removed.

### Follow up

1. The patient will have regular follow-up with the surgeon.
2. The surgeon should be contacted if:
  - Patient has pain at a pin site that lasts more than 2 days.
  - Patient feels that he/she can move his/her neck.
  - Patient has changes in sensation or movement on any of his/her 4 limbs.
  - Patient has rattling sounds from his/her vest or halo crown.
  - Sheepskin lining is soiled.
  - Pin sites look infected.
  - Pins are loose.
  - Patient develops skin breakdown under the vest.
  - Patient develops a severe headache.
  - Changes in neurological status.

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