Developed by the BC Provincial Interprofessional Skin & Wound Committee in collaboration with OTs/PTs/NSWOCs/WCs from:

# Hand Check for Immersion – Powered Support Surfaces: Procedure

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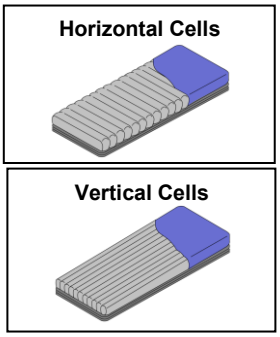
| **Endorsement**<br>**British Columbia (BC) & Yukon** | Endorsement: TBD<br><br>Endorsement pending: FNHA, FHA, IHA, ISLH, NHA, PHSA, VCH/PHC & Yukon; until endorsement has been granted by your health authority (HA), please follow your HA's current document. |
| **DST Indications for Use** | This decision support tool (DST) guides the health care team in performing a hand check to assess the client's level of immersion on a powered support surface (SS) to ensure the:<br>○ Client is not at risk of developing pressure injuries (PI) related to their SS.<br>○ SS provides appropriate pressure distribution to support healing of PI if present.<br><br>This document does not provide guidance in performing a hand check for immersion for either a ROHO section(s)/mattress or chair support surfaces. For ROHO, see pg. 2 of its PISheet, for chair support surfaces, see vendor information. |
| **Practice Level**<br>**BC & Yukon** | Occupational Therapists, Physiotherapists, Registered Nurses, Registered Psychiatry Nurses, Licenced Practical Nurses, Rehab Assistants as well as Health Care Aides where assigned/delegated as per HA/agency. |
| **Need to Know** | • There are three types of SS that provide pressure re-distribution:<br>○ Reactive:<br>○ Non-powered SS's components, such as high-density foam, gel, gel/foam, or static air, move in response to the client's shift of weight.<br>○ Powered SS's major component is a continuous flow of air which responds to the client's shift of weight.<br>○ Active: powered SS, which when programmed, actively inflates and deflates air cells on a set cycle, the client's weight is shifted in response to inflation and deflation of the air cells.<br>Regardless of whether the SS is powered or non-powered, the client requires turning, (e.g., every 2 hours or as per care plan).<br>• Immersion hand checks are done for SSs and there are two methods for doing the checks for powered SSs:<br>○ **Internal**: done between the horizontal air cells inside the SS where the cover can be opened to allow access from the side of the SS to the air cells, (e.g., Arjo TheraKair Visio or Arjo First Step All In One).<br>○ **External:** done on top of the SS when the cover does not allow access inside the SS, or the SS is designed with vertical air cells, (e.g., Arjo Auralis).<br>• The hand check assists to determine if the client is: |

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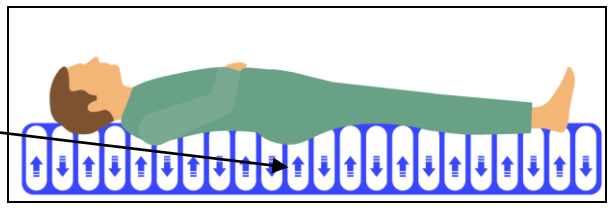
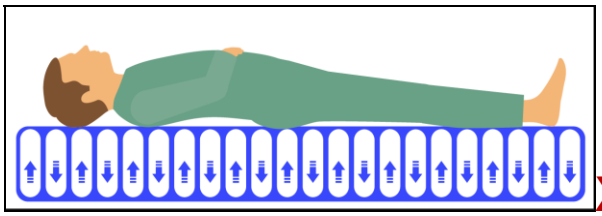
| Appropriately immersed, client is slightly sunk into the SS.<br><br>Hand checks are done in this area beneath the bony prominence and the bottom of the SS. |  |
| Under-immersed, client is lying on top of the SS rather than being immersed into it; this indicates the SS has too much air, making it too firm. |  |

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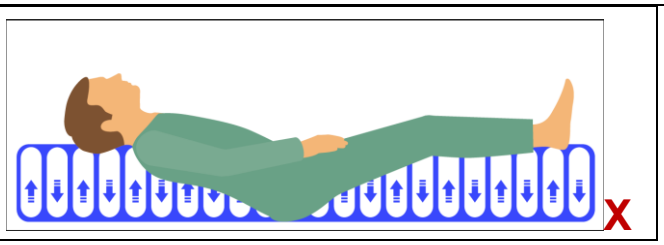
| | Over-immersed (bottoming-out), client's bony prominence is in close proximity to the bedframe, this indicates the SS does not have enough air, making it too soft.  <br>• Immersion hand check is done for any of the following:<br>  ○ When the TSS is first set up.<br>  ○ A new PI is identified.<br>  ○ The PI is not improving or appears to be worsening.<br>  ○ The client reports or indicates discomfort or pain.<br>  ○ If visually client appears to be over-immersed or under-immersed in the SS.<br>  ○ Routine check as per HA/agency process.<br>  ○ There is a concern with a malfunction of the SS.<br>• The check should be done regardless of the client's weight, and with the client in each of the following positions to assess the client's lowest bony prominence:<br>  1. Supine (sacrum).<br>  2. Side lying (greater trochanter).<br>  3. Sitting up - HOB 30 degrees (sacral-coccyx, ischial tuberosities)<br>  4. Sitting up - HOB 60 degrees (sacral-coccyx, ischial tuberosities).<br>• Doing a hand check is an 'art not a science'; use clinical judgement, experience and client's feedback to determine the best setting for the SS. |
| **Bookmarks** | Procedure: Internal Hand Check<br>Procedure: External Hand Check<br>Documentation<br>Definitions<br>References/Bibliography<br>Document Management |
| **Related DSTs** | Guideline: Pressure Injury Prevention |

## Equipment, Supplies & Information

- Pair of gloves if doing a surface check
- Plastic sleeve/bag if doing an internal check to allow hand and arm to slide into the SS.
- Tape or paper label
- Permanent marker
- Client's height & weight

| Hand Check - Initial SS Set-Up: Procedure | |
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| **Steps** | **Rationale/Key Points** |
| 1. If the client is going onto a SS or being moved to another SS, do a head-to-toe skin assessment. | Skin assessment establishes the client's baseline prior to going onto a SS or being moved to another SS. |
| 2. Set up the SS and calibrate the pump as per manufacturer instructions, client's weight and comfort level/ tolerance. | TSS vendor technician may do the set-up. |
| 3. Determine if SS's top cover allows access to air cells from the side:<br>• If so, then go to Internal Hand Check Procedure.<br>• If no, then go to External Hand Check Procedure. | |

| Internal Hand Check: Procedure | |
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| **Steps** | **Rationale/Key Points** |
| 1. Set up for the check:<br>• Ensure SS pump's weight is correct for the client.<br>• Ensure bed is:<br>  ○ At the appropriate height to safely perform check.<br>  ○ In a flat position and brakes are fully locked.<br>• Ensure minimal layers between client and the SS.<br>• If client has a care requirement such as a heel offloading boot, ensure device is on. | Multiple layers reduces immersion into the SS, negatively affect the microclimate between the skin and the SS, as well as increases the risk of a PI; consider a loose, stretchy fitted sheet, and if needed a disposable linen protector pad and/or positioning sling (HA/agency approved).<br>Hand check needs to be done with the device(s) the client would wear through-out the day. |
| 2. Unzip SS's top cover to allow access to air cells from the side. | If the SS top cover cannot be unzipped see below for the External Hand Check procedure. |
| 3. Position client for the check, (e.g., first check - supine). | |
| 4. Perform hand hygiene. Put on gloves and, if using, a plastic sleeve. | Glove/sleeve allows the hand to move easily between the SS's air cells. |
| 5. Insert hand in between the air cells under the lowest bony prominence.<br>For a powered reactive surface: position hand flat and move hand/fingers up and down; should be able to move at least 2.5cm in the space between the bony prominence and the bottom of the SS.<br>For an active surface – as above but with additional consideration, check for bottoming out when the cell under the lowest bony prominence is at its lowest inflation; may need to wait for cell to deflate as per its programmed cycle. | **Over-immersed (bottoming out):** hand/fingers are crushed and/ or there is less than 2.5cm between the bony prominence and the base of the SS; client is over-immersed in the SS leading to difficulty with self-positioning and the risk of developing a PI or the deterioration an existing PI.<br>**Under-immersed**: hand/fingers move greater than 2.5cm in the space between the bony prominence and the base of the SS; client is 'laying' on top of the SS with little or no immersion.<br>**Appropriately immersed:** hand/fingers move 2.5cm in the space between the bony prominence and the base of the SS; client is appropriately immersed in the SS. |
| 6. Adjust the pump setting if over-immersion or under-immersion was noted:<br>• Change the firmness by slowly increasing or decreasing the setting in one level increments:<br>  ○ Over-immersed: increase setting to add more air.<br>  ○ Under-immersed: decrease setting to remove some air.<br>• Allow 5 minutes for the SS to fully adjust then:<br>  ○ Check for client comfort.<br>  ○ Repeat hand check.<br>• Note the pump setting for this position, (e.g., the first check - supine). | Small incremental adjustments (e.g., one at a time) are needed as most often a slight change will correct the issue (may vary as per pump).<br>See the TSS's manufacturer instructions or Product Information Sheet, (e.g., for the First Step All In One or Therakair) for how to adjust the SS firmness.<br>First Step All In One or Therakair |
| 7. Repeat Steps 3 – 6 for the other positions:<br>• Side-lying.<br>• Sitting up HOB 30 degrees.<br>• Sitting up HOB 60 degrees. | |
| 8. Once all four positions are checked:<br>• Determine which position is most critical to the client, (e.g., HOB at 60 degrees due to SOB.<br>• Set the pump to that setting.<br>• Communicate pump setting with staff as per site/unit process, (e.g., laminated label on pump). | The client's specific inflation setting should be labelled on the SS pump, (e.g., Inflation 6.0; Alternating Mode). |

| External Hand Check: Procedure | |
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| **Steps** | **Rationale/Key Points** |
| 1. Set up for the check:<br>• Ensure SS pump's weight is correct for the client.<br>• Ensure bed is:<br>  ○ At the appropriate height to safely perform check.<br>  ○ In a flat position and brakes are fully locked.<br>• Ensure minimal layers between client and the SS.<br>• If client has a care requirement such as a heel offloading boot, ensure device is on. | Multiple layers reduces immersion into the SS, negatively affect the microclimate between the skin and the SS, as well as increases the risk of a PI; consider a loose, stretchy fitted sheet, and if needed a disposable linen protector pad and/or positioning sling (HA/agency approved).<br>Hand check needs to be done with the device(s) the client would wear through-out the day. |
| 2. Position client for the check, (e.g., first check - supine). | |
| 3. Perform hand hygiene. Put on gloves and, if using, a plastic sleeve. | Glove/sleeve allows the hand to move easily between the SS's air cells. |
| 4. Insert hand between lowest bony prominence and the top of the SS.<br>For a powered reactive surface: position hand flat and move hand/fingers up and down; should be able to move at least 2.5cm in the space between the bony prominence and the bottom of the SS.<br>For an active surface – as above but with additional consideration, check for bottoming out when the cell under the lowest bony prominence is at its lowest inflation; may need to wait for cell to deflate as per its cycle. | **Over-immersed (bottoming out):** hand/fingers are crushed and/ or there is less than 2.5cm between the bony prominence and the base of the SS; client is over-immersed in the SS leading to difficulty with self-positioning and the risk of developing a PI or the deterioration an existing PI.<br>**Under-immersed**: hand/fingers move greater than 2.5cm in the space between the bony prominence and the base of the SS; client is 'laying' on top of the SS with little or no immersion.<br>**Appropriately immersed:** hand/fingers move 2.5cm in the space between the bony prominence and the base of the SS; client is appropriately immersed in the SS. |
| 5. Adjust the pump setting if over-immersion or under-immersion was noted:<br>• Change the firmness by slowly increasing or decreasing the setting in one level increments:<br>  ○ Over-immersed: increase setting to add more air.<br>  ○ Under-immersed: decrease setting to remove some air.<br>• Allow 5 minutes for the SS to fully adjust then:<br>  ○ Check for client comfort.<br>  ○ Repeat hand check.<br>• Note the pump setting for this position, (e.g., the first check - supine). | Small incremental adjustments (e.g., one at a time) are needed as most often a slight change will correct the issue (may vary as per pump).<br>Also see the TSS's manufacturer instructions or Product Information Sheet, (e.g., for the Auralis) for how to adjust the SS firmness.<br>Auralis |
| 6. Repeat Steps 2 – 5 for the other positions:<br>• Side-lying.<br>• Sitting up HOB 30 degrees.<br>• Sitting up HOB 60 degrees. | |
| 7. Once all four positions are checked:<br>• Determine which position is most critical to the client, (e.g., HOB at 60 degrees due to SOB.<br>• Set the pump to that setting.<br>• Communicate pump setting with staff as per site/unit process, (e.g., laminated label on pump). | The client's specific inflation setting should be labelled on the SS pump, (e.g., Inflation 6.0; Alternating Mode). |

## Documentation

As per HA/agency policy/standards, document the SS setting and the rationale for the chosen setting.

## Definitions

**Active Support Surface:** *A powered support surface with the capability to change its pressure redistribution properties independent of applied load. (NPIAP).* This capability is due to *alternating pressure, a design feature of a support surface that utilizes cyclic changes in loading and unloading as characterized by frequency, duration, amplitude, and rate of change parameters. It provides active pressure redistribution (NPIAP).* The alternating pressure is a programmable feature of the support surface which causes the cells within the support surface to inflate and deflate on a predetermined schedule which redistributes the person's weight. Pressure redistribution is achieved by frequent changes of the points of contact between the support surface and the body, reducing the duration of the pressure to specific body areas. Not all alternating pressure systems are the same – differences can be seen in cell size, cell configuration (horizontal vs. vertical), and cycle frequency/duration/amplitude. Active SSs are not indicated for neonates and children who are slight in weight.

**Bottoming Out:** *The state of support surface deformation beyond critical immersion whereby effective pressure redistribution is lost*[2]*.* The person's body is so immersed into the support surface such that their bony prominence(s) is in close proximity to or rests on the hard surface of the bedframe.

**Client:** a generic term used to describe a person accessing care regardless of care setting; patient in the hospital, client in community; resident/person-in-care in long-term care.

**Health Care Aide**: Term used within British Columbia to describe a variety of workers including, but not limited to, the following job titles: Assisted Living Workers, Community Health Workers, Resident Care Attendants, Care Aides, Home Support Workers, and Personal Support Workers.

**Immersion:** *Penetration (sinking) into a support surface, measured by depth*[2]*.* A feature of a support surface that allows a person's body to settle into the support surface. If not deep enough, the support surface may feel uncomfortable to the person, if too deep, the person may be unable to move, be trapped in the support surface.

**Reactive Support Surface:** *A powered or non-powered support surface with the capability to change its pressure redistribution properties only in response to applied load (NPIAP)*. When the person is lying on the support surface (load), the cells, which contain either a continuous flow of air (powered) or gel/foam (non-powered), empty and fill in response to the person's movement. Given the responsiveness of these materials to the pressure, the pressure is distributed over a greater area reducing the magnitude of the pressure on specific body areas.

## References/Bibliography


1. Arjo (2019). *Instruction for Use TheraKair Visio Mattress Replacement System*. Arjo (Ed.)
2. National Pressure Injury Advisory Panel (NPIAP) (2024). *Terms and Definitions Related to Support Surfaces.*
3. National Pressure Injury Advisory Panel, European Pressure Ulcer Advisory Panel and Pan Pacific Pressure Injury Alliance. *Full Body Support Surfaces for Prevention of Pressure Injuries (Part 1). In: Prevention and Treatment of Pressure Ulcers/Injuries: Clinical Practice Guideline.* The International Guideline: Fourth Edition. Emily Haesler (Ed.). 2025.
4. Province of British Columbia. (2023). Health Care Assistant Program Provincial Curriculum.
5. Registered Nurses Association of Ontario (RNAO) (2024). *Best Practice Guideline – Pressure injury management: Risk assessment, prevention and treatment (Fourth edition).*
5. Wounds Canada (2023). *Product Picker: Integrated Therapeutic Support Surface Selection for Pressure Injury Prevention and Management.*

## Document Management

This guideline is based on the best information available at the time of its Provincial Partner Review, relies on evidence and expert consensus, and avoids opinion-based statements where possible.

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