NeuroRehabilitation 52 (2023) 149–151
DOI:10.3233/NRE-228028
IOS Press



Cochrane Corner

rehabilitation.cochrane.org

# How effective is alternating pressure (active) air surfaces for preventing pressure ulcers? A Cochrane Review summary with commentary

Julia Patrick Engkasan*
*Department of Rehabilitation Medicine, Universiti Malaya, Kuala Lumpur, Malaysia*
*Email: julia@ummc.edu.my*

**Abstract**.
**BACKGROUND:** Pressure ulcers may develop in people with impaired mobility, sensation, or cognition. Alternating pressure (active) air beds, overlays and mattresses are commonly used to prevent pressure ulcers.
**OBJECTIVE:** This Cochrane Review aimed to determine the effects of alternating pressure (active) air beds, overlays or mattresses compared with any support surface in preventing pressure ulcers.
**METHODS:** The population addressed was people at risk of and with existing pressure ulcers. Studies comparing alternating pressure (active) air surfaces with any beds, overlays or mattresses were included. The outcomes studied were pressure ulcer incidence, patient support-surface-associated comfort, adverse events, health-related quality of life and cost-effectiveness.
**RESULTS:** There were 32 studies with a total of 9058 participants. There is low certainty evidence that alternating pressure (active) air surfaces compared with foam surfaces may reduce the incidence of pressure ulcers. It is uncertain whether there is a difference in the proportion of people developing new pressure ulcers between alternating pressure (active) air surfaces and reactive water-filled, fibre, air, gel or standard hospital surfaces.
**CONCLUSION:** The use of alternating pressure (active) air surfaces may reduce the incidence of pressure ulcers compared to foam surfaces. However, it is uncertain if it is superior to reactive air surfaces, water surfaces and fiber surfaces in preventing pressure ulcers.

Keywords: Pressure injury, wound, support surfaces, bedsores

The aim of this commentary is to discuss from a rehabilitation perspective the Cochrane Review "Alternating pressure (active) air surfaces for preventing pressure ulcers" by Shi C, Dumville JC, Cullum N, Rhodes S, Jammali-Blasi A, & McInnes E[a], published by Cochrane Wounds. This Cochrane

[a]This summary is based on a Cochrane Review previously published in the Cochrane Database of Systematic Reviews 2021, Issue 5, Art. No.:CD013620, DOI: 10.1002/14651858.CD013620.pub2 (see www.cochranelibrary.com for information). Cochrane Reviews are regularly updated as new evidence emerges and in response to feedback, and Cochrane Database of Systematic Reviews should be consulted for the most recent version of the review.
The views expressed in the summary with commentary are those of the Cochrane Corner author (different than the original Cochrane Review authors) and do not represent the Cochrane Library or Wiley.

Corner is produced in agreement with NeuroRehabilitation by Cochrane Rehabilitation with views* of the review summary author in the "implications for practice" section.

## 1. Background

Pressure ulcers are localized injuries to the skin or underlying soft tissue, caused by unrelieved pressure, shear, or friction. Patients with neurological disorders are at risk of developing pressure ulcers (National Institute for Health and Care Excellence, 2014). Pressure ulcers can be prevented with the use of active or reactive support surfaces. Active support surfaces, including alternating pressure (active) air surfaces, change the contact points and thus reduce the duration of pressure applied (Clark, 2011). Meanwhile, reactive support surfaces redistribute pressure over a greater area and reduce the amount of pressure at specific body points (Clark, 2011). Since the use of support surfaces are recommended in practice guidelines, it is important to establish the evidence behind this recommendation.

**Alternating pressure (active) air surfaces for preventing pressure ulcers**

(Shi C, Dumville JC, Cullum N, Rhodes S, Jammali-Blasi A, McInnes E, 2021)

## 2. Objective

The aim of this Cochrane Review was to examine the effects of alternating pressure (active) air surfaces compared with any support surfaces on the incidence of pressure ulcers.

## 3. What was studied and methods

The population addressed in this review was people at risk of and with existing pressure ulcers. The interventions studied were alternating pressure (active) air beds, overlays, or mattresses. The comparators are other support surfaces. The outcomes studied were pressure ulcer incidence, patient comfort, adverse events, health related quality of life and cost-effectiveness.

## 4. Results

The review included 32 studies with a total of 9058 participants (55.6% female). The mean age ranged from 37.2 to 87.0 years (median 69.1 years). The median follow up was 14 days (range 3 to 180 days).

The review shows that:

- There is low certainty that alternating pressure (active) air surfaces may reduce the proportion of participants developing pressure ulcers compared with foam surfaces (7.4% versus 10.4%, Relative Risk [RR] 0.63, 95% Confidence Interval [CI] 0.34 to 1.17).
- There is low certainty that alternating pressure (active) air surfaces applied on both operating tables and hospital beds may reduce the proportion of people developing new pressure ulcers compared with reactive gel surfaces used on operating tables followed by foam surfaces applied on hospital beds (1.4% versus 6.8%, RR 0.22, 95% CI 0.06 to 0.76).
- There is very low certainty in the proportion of participants developing pressure ulcers between alternating pressure (active) air surfaces and reactive air surfaces (4.0% versus 2.2%, RR 1.61, 95% CI 0.90 to 2.88), reactive water surfaces (6.5% versus 5.2%, RR 1.21, 95% CI 0.52 to 2.83), and reactive fibre surfaces (38.3% versus 42.4%, RR 0.90, 95% CI 0.68 to 1.19).
- The evidence is of low certainty in the proportion of people developing pressure ulcers between different types of alternating pressure (active) air surfaces.
- It is uncertain if there are any differences in patients' comfort, adverse events or quality of life between the different support surfaces.
- Alternating pressure (active) air surfaces are more cost-effective than foam surfaces for preventing pressure ulcers.

## 5. Conclusions

Alternating pressure (active) air surfaces compared with foam surfaces may reduce the risk of having a new pressure ulcer and are probably more cost-effective. The use of alternating pressure (active) air surfaces on both operating tables and hospital beds may reduce pressure ulcer incidence compared with reactive gel surfaces used on operating tables followed by foam surfaces applied on hospital beds. It

is uncertain if there is a difference in the incidence of pressure ulcers between alternating pressure (active) air surfaces and reactive water, fibre or air surfaces.

## 6. Implications for practice in neurorehabilitation

Neurorehabilitation clinicians routinely deal with patients with a variety of neurological illnesses which restrict the patient's mobility and affect sensation. Clinicians may consider prescribing alternating pressure (active) air surfaces instead of foam surfaces for persons at risk of developing pressure ulcers. As there is no strong evidence to support the effectiveness of alternating (active) air surfaces over reactive air, water, or fiber reactive surfaces, decision-making may depend on other factors such as clinicians' or patients' preference, cost, level of dependency and body size and weight. The low to very low certainty evidence generated from this review indicates the need for higher quality research. Researchers should plan studies with larger sample size, description of co-interventions, inclusion of time to event outcome and adequate length of follow up.

## Conflict of interest

The author declares no conflicts of interest.

## Acknowledgments

The author thanks Cochrane Rehabilitation and Cochrane Wounds for reviewing the contents of the Cochrane Corner.

## References

[1] Shi, C., Dumville, J. C., Cullum, N., Rhodes, S., Jammali-Blasi, A., & McInnes, E. (2021). Alternating pressure (active) air surfaces for preventing pressure ulcers. *The Cochrane Database of Systematic Reviews*, *5*(5), CD013620. https://doi.org/10.1002/14651858.CD013620.pub2

[2] Clark, M. (2011).Technology update: understanding support surfaces. *Wounds International,* 2(3):17-21.

[3] Mervis, J. S., & Phillips, T. J. (2019). Pressure ulcers: Pathophysiology, epidemiology, risk factors, and presentation. *Journal of the American Academy of Dermatology*, *81*(4), 881–890. https://doi.org/10.1016/j.jaad.2018.12.069