

Recommendation Question 6 Evidence Profile

Recommendation question 6: Should the use of powered support surfaces (active or reactive) for the prevention and management of pressure injuries be recommended or not?

No recommendation was made. The expert panel determined that current evidence was insufficient to balance the benefits and harms of powered support surfaces compared to non-powered support surfaces.

Population: Persons with or at risk of pressure injuries (PI)

Intervention: Powered support surfaces

Comparison: Non-powered support surfaces

Outcomes: Healing rate of existing pressure injury [critical], Prevalence or incidence rate of pressure injury [critical], Pain [critical] (not measured), Worsening pressure injury [critical] (not measured), Pressure injury precursor signs and symptoms [Critical] (not measured)

Setting: All health-care settings, including but not limited to: community care, outpatient care, and acute care.

Bibliography: 146, 204, 33

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Quality assessment							No. of participants		Effect	Certainty	Reference
No of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Publication bias	Intervention	Control			
Incidence of pressure injury (median follow-up 14 days (range: 3 days to 12 months))											
Reactive powered vs non-powered											
4 ^a	SR and NMA of RCT	Serious ^b	Serious ^c	Not serious	Not serious	Not detected	N=229 (total participants)	NR	RR 0.46 (0.29 to 0.75) For every 100 people with a reactive mattress, there would be 6 less pressure injuries (ranges from 3 less to 8 less).	⊕⊕○○ Low	146: Shi et al., 2021
Active powered vs non-powered											
4 ^d	SR and NMA of RCT	Serious ^e	Serious ^f	Not serious	Not serious	Undetected	N=2247 (total participants)	NR	RR 0.63 (0.42 to 0.93) For every 100 people with an active mattress, there would be 4 less pressure injuries (ranges from 1 less to 6 less).	⊕⊕○○ Low	146: Shi et al., 2021
1	RCT	Very serious ^g	Not serious	Not serious	Very serious ^h	Undetected	Static air surface 8 PI events/ 154 participants	Active powered surface 18 PI events/ 154 participants	RR (95% CI): 0.44 (0.20- 0.99) For every 100 people who receive static air mattress, 7 less people will have pressure injury (ranges from 10 less to no more or less).	⊕○○○ Very Low	33: Beeckman, 2019
Healing rate (Follow-up: 13 days, 12 weeks)											
Reactive powered vs non-powered											
2 ⁱ	SR and NMA of RCT	Not serious	Not serious	Not serious	Very serious ^j	Not detected	N= 156 (total participants)	NR	RR 1.32 (0.96 to 1.80) For every 100 people with a reactive mattress, there would be 13 more pressure injuries completely healed (ranges from 2 less to 37 more).	⊕⊕○○ Low	146: Shi et al., 2021

Active powered vs non-powered											
1 ^k	SR and NMA of RCT	Very serious ^l	Not serious	Not serious	Serious ^m	Undetected	PI healing events/ participants: 5/31 N= 49 (total participants)	PI healing events/ participants: 3/18	RR 0.97 (0.26 to 3.58) For every 100 people with an active mattress, there would be 1 less pressure injury completely healed (ranges from 30 less to 59 more).	⊕○○○ Very low	146: Shi et al., 2021
Pain [measured indirectly as patient comfort] (follow-up range: 8-14 days)											
4 ⁿ	SR and NMA of RCT	Not serious	Not serious	Serious ^o	Serious ^p	Not detected	N= 802 (total participants)	NR	RR 0.27 (95% CI 0.11 to 0.67) For every 100 people with a reactive powered mattress, 63 fewer patients would report comfort (ranges from 29 less to 77 less).	⊕⊕○○ Low	204: Shi et al., 2018
Worsening pressure injuries (not measured)											
N/A											
Precursor signs and symptoms (not measured)											
N/A											

Additional table- Individual study details

Reference	Study Design	Country	Intervention Group Details	Control Group Details	Reported Effects/Outcomes	Risk of bias
Outcome: Incidence of PI						
Allman, 1987 Takala, 1996 Van Leen, 2011 Van Leen, 2013 (Taken from review Shi et al., 2021)	4 RCTs reported in Overview of review and network meta-analysis	USA, Finland, Netherlands	Acute and long-term care settings Reactive powered air surfaces	Foam surfaces	RR 0.46 (0.29 to 0.75) For every 100 people with a reactive mattress, there would be 6 less pressure injuries (ranges from 3 less to 8 less). SUCRA: 78.1% It is uncertain how likely it is that reactive air surfaces are the best intervention in reducing pressure ulcer incidence.	SR and network meta-analysis: LOW Individual studies: SERIOUS

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Nixon, 2019 Rosenthal, 2003 Sauvage, 2017 Stapleton, 1986 (Taken from review Shi et al., 2021)	4 RCT reported in Overview of review and network meta-analysis	UK (others Europe or North America, NR)	Alternating pressure (active) air surfaces	Foam surfaces	RR 0.63 (0.42 to 0.93) For every 100 people with an active mattress, there would be 4 less pressure injuries (ranges from 1 less to 6 less). SUCRA: 59.3% It is uncertain how likely it is that reactive air surfaces are the best intervention in reducing pressure ulcer incidence	SR and network meta-analysis: LOW Individual studies: SERIOUS
Beeckman, 2019	RCT	Belgium	The study was conducted in 26 nursing homes with residents at high risk of developing pressure injuries. The participants in the intervention group were provided with the static air support surfaces (Repose1) based on the preference of the participants and the clinical judgement of the researchers.	The support surfaces in the control group were not standard to reflect current clinical practice (alternating air powered surfaces).	RR 0.63 (0.42 to 0.93) For every 100 people with an active mattress, there would be 4 less pressure injuries (ranges from 1 less to 6 less).	VERY SERIOUS
Outcome: healing rate						
Allman, 1987 Ferrell, 1993 (Taken from review Shi et al., 2021)	2 RCTs reported in Overview of review and network meta-analysis	USA	Acute and long-term care setting Reactive powered air surfaces	Foam surfaces	RR 1.32 (0.96 to 1.80) For every 100 people with a reactive mattress, there would be 13 more pressure injuries completely healed (ranges from 2 less to 37 more). SUCRA: 83.9% It is uncertain how likely it is that reactive air surfaces are the best intervention in healing pressure ulcers.	SR and network meta-analysis: LOW Individual studies: LOW
Mulder, 1994 (Taken from review Shi et al., 2021)	1 RCT reported in Overview of review and network meta-analysis	USA	Alternating pressure (active) air surfaces Setting: community & long-term care Pressure ulcers: stage 3 and 4	Foam surfaces	RR 0.97 (0.26 to 3.58) For every 100 people with an active mattress, there would be 1 less pressure injury completely healed (ranges from 30 less to 59 more). SUCRA: 43% It is uncertain how likely it is that alternating pressure (active) air surfaces are the best intervention in healing pressure ulcers.	SR and network meta-analysis: LOW Individual studies: VERY SERIOUS
Outcome: patient comfort						
Individual studies contributing to the network: Andersen, 1982 Finnegan, 2008 Gray, 1994	4 RCTs reported in Systematic review and network meta-analysis	Denmark, USA, UK, Canada	Powered reactive air-fluidized surfaces Population: adult patients at risk of developing pressure injury Setting: general hospital setting, orthopedic ward	Standard care	RR 0.27 (95% CI 0.11 to 0.67) For every 100 people with an active mattress, 63 fewer patients would report comfort (ranges from 29 less to 77 less).	Network meta-analysis: LOW Individual studies: LOW

Vermette, 2012 (Taken from review Shi et al., 2018)			N= 802 (total)		SUCRA: 79.8% (ranked third highest probability of being the most comfortable)	
Individual studies contributing to the network: Andersen, 1982 Finnegan, 2008 Gray, 1994 Vermette, 2012 (Taken from review Shi et al., 2018)	4 RCTs reported in Systematic review and network meta-analysis	Denmark, USA, UK, Canada	powered active air-cells surfaces Population: adult patients at risk of developing pressure injury Setting: general hospital setting, orthopedic ward N= 802 (total)	Standard care	RR 0.80 (95% CI 0.69 to 0.94) For every 100 people with an active mattress, 17 fewer patients would report comfort (ranges from 5 less to 27 less). SUCRA: 8% (ranked lowest probability of being the most comfortable)	SR and network meta-analysis: LOW Individual studies: LOW

Acronyms:

CI: confidence interval
PI: pressure injury
NMA: network meta-analysis
NR: not reported
RCT: randomized control trial
RR: relative risk
SUCRA: Surface Under the Cumulative RAnking

Explanations:

- ^a Four RCTs were included from a systematic review (Shi et al., 2021).
- ^b Review authors assessed risk of bias with the Cochrane ROB 2.0 tool. Individual studies were rated as some concerns due to lack of blinding of participants or outcome assessors. We downgraded by 1.
- ^c Review authors noted inconsistency/heterogeneity. We downgraded by 1.
- ^d Four RCTs were included in the prevention network meta-analysis comparing active air mattresses to foam reported in Shi et al, 2021.
- ^e Review authors assessed risk of bias with the Cochrane ROB 2.0 tool. Individual studies were rated as some concerns due to lack of blinding of participants or outcome assessors. We downgraded by 1.
- ^f Review authors noted inconsistency/heterogeneity. We downgraded by 1.
- ^g Risk of bias was assessed with the Cochrane ROB 2.0 tool. Study was rated as high risk of bias due to lack of blinding of participants and outcome assessors. We downgraded by 2.
- ^h Very low number of events less than the optimal 300 (n=26). We downgraded by 2.
- ⁱ Two RCTs were included from a systematic review (Shi et al., 2021).
- ^j Low number of events and corresponding wide confidence interval. We downgraded by 2.
- ^k One RCT was included in the treatment network meta-analysis comparing active air mattresses to foam reported in Shi et al, 2021.
- ^l Review authors assessed risk of bias with the Cochrane ROB 2.0 tool. Individual study was rated as high risk of bias due to incomplete outcome data. We downgraded by 2.
- ^m Very wide confidence interval. We downgraded by 1.
- ⁿ Four RCTswere included in the comfort network meta-analysis reported by Shi et al, 2018.
- ^o Indirect measure of pain. We downgraded by 1.

Ⓟ Low number of events. We downgraded by 1.

References:

Beeckman D, Serraes B, Anrys C, Van Tiggelen H, Van Hecke A, Verhaeghe S. A multicentre prospective randomised controlled clinical trial comparing the effectiveness and cost of a static air mattress and alternating air pressure mattress to prevent pressure ulcers in nursing home residents. *International Journal of Nursing Studies*. 2019 Sep;97:105–13.

Shi C, Dumville JC, Cullum N, Rhodes S, McInnes E, Goh EL, et al. Beds, overlays and mattresses for preventing and treating pressure ulcers: an overview of Cochrane Reviews and network meta-analysis. Cochrane Wounds Group, editor. *Cochrane Database of Systematic Reviews* [Internet]. 2021 Aug 16 [cited 2023 Nov 28];2021(8). Available from:

<http://doi.wiley.com/10.1002/14651858.CD013761.pub2>

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