



School of Continuous
Professional Development

CARE OF THE OLDER ADULT

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School of Continuous
Professional Development

UPDATE ON EVIDENCE IN PRESSURE INJURIES

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DISCLOSURE OF RELEVANT FINANCIAL RELATIONSHIP(S) WITH INELIGIBLE COMPANIES

- Nothing to disclose

REFERENCES TO OFF-LABEL USAGE(S) OF PHARMACEUTICALS OR INSTRUMENTS

- Nothing to disclose

All relevant financial relationships have been mitigated.

LEARNING OBJECTIVES

- Apply the recent understanding of nutritional supplementation on pressure injuries
- Explain the evidence of turning schedules and mattresses for pressure injury relief.
- Summarize the evidence for wound dressings to prevent pressure injury

Overview of Pressure Injury

- Common problem with 2-28% of patients in long term care having a pressure ulcers
- Typically occur in areas of pressure (sacral)
- Can occur in other areas of pressure (heels)
- Risk factors: Phenotype of frailty (weight loss, mobility issues, multimorbidity, etc), Braden score, other risk predictor scores
- Possible to have mixed etiologies of ulceration
- Ischemic, venous and neuropathic

Diagnosis of Pressure Injury

- **Examine the skin (all team members)**
- **Stage the ulcers**
- Stage One
- Stage Two
- Stage Three
- Stage Four
- **Determine Infection**
- **Treatment:**
- Offload the pressure (turning, mattresses)
- Nutritional support
- Local wound therapy (hydration)





Pressure Injury Evidence Caveats

- Making the appropriate diagnosis (Pressure injury, ischemic ulcer, venous ulcer, neuropathic ulcer, or small vessel ulcer) potential mixed
- Prevention versus Treatment
- Recognize inherent bias with single site studies
- Clinical Trials versus observational data
- Generalizability
- Diversity, Equity and Inclusion issues.
- When possible, these issues will be addressed when discussing new articles and evidence.

ARS QUESTION

Use this WF2464754 for your Audience Response (ARS) portion of your presentation. This format meets the requirements of MOC and AV.

Which predictor is not a part of the Braden Scale for Predicting Pressure Injury?

1. Weight Loss
2. Presence of Heart Failure
3. Urinary Incontinence
4. Wheelchair for mobility

ARS QUESTION

Use this WF2464754 for your Audience Response (ARS) portion of your presentation. This format meets the requirements of MOC and AV.

1. Weight Loss
2. Heart Failure
3. Urinary Incontinence
4. Wheelchair for mobility

RATIONALE

Use this WF2464754 for your Audience Response (ARS) portion of your presentation. This format meets the requirements of MOC and AV.

- Other factors are a part of the Braden score and largely represent frailty.
- Braden Skin Score
- Sensory Perception
- Moisture
- Activity
- Mobility
- Nutrition
- Shear and Friction

Sensory Perception ☐ 1 = Completely Limited ☐ 2 = Very Limited ☐ 3 = Slightly Limited ☐ 4 = No Impairment	Moisture ☐ 1 = Constantly Moist ☐ 2 = Very Moist ☐ 3 = Occasionally Moist ☐ 4 = Rarely Moist	Activity ☐ 1 = Bedfast ☐ 2 = Chairfast ☐ 3 = Walks Occasionally ☐ 4 = Walks Frequently
Mobility ☐ 1 = Completely Immobile ☐ 2 = Very Limited ☐ 3 = Slightly Limited ☐ 4 = No Limitations	Nutrition ☐ 1 = Very Poor ☐ 2 = Probably Inadequate ☐ 3 = Adequate ☐ 4 = Excellent	Friction and Shear ☐ 1 = Problem ☐ 2 = Potential Problem ☐ 3 = No Apparent Problem
Braden Score = _____ If score is < 11, Obtain MD order for WOC Nurse Consult	Pressure Ulcer Present at Time of admission ☐ Yes ☐ No ☐ Unable to assess (comment required)	For A "Yes" answer Obtain MD Order for WOC Nurse Consult

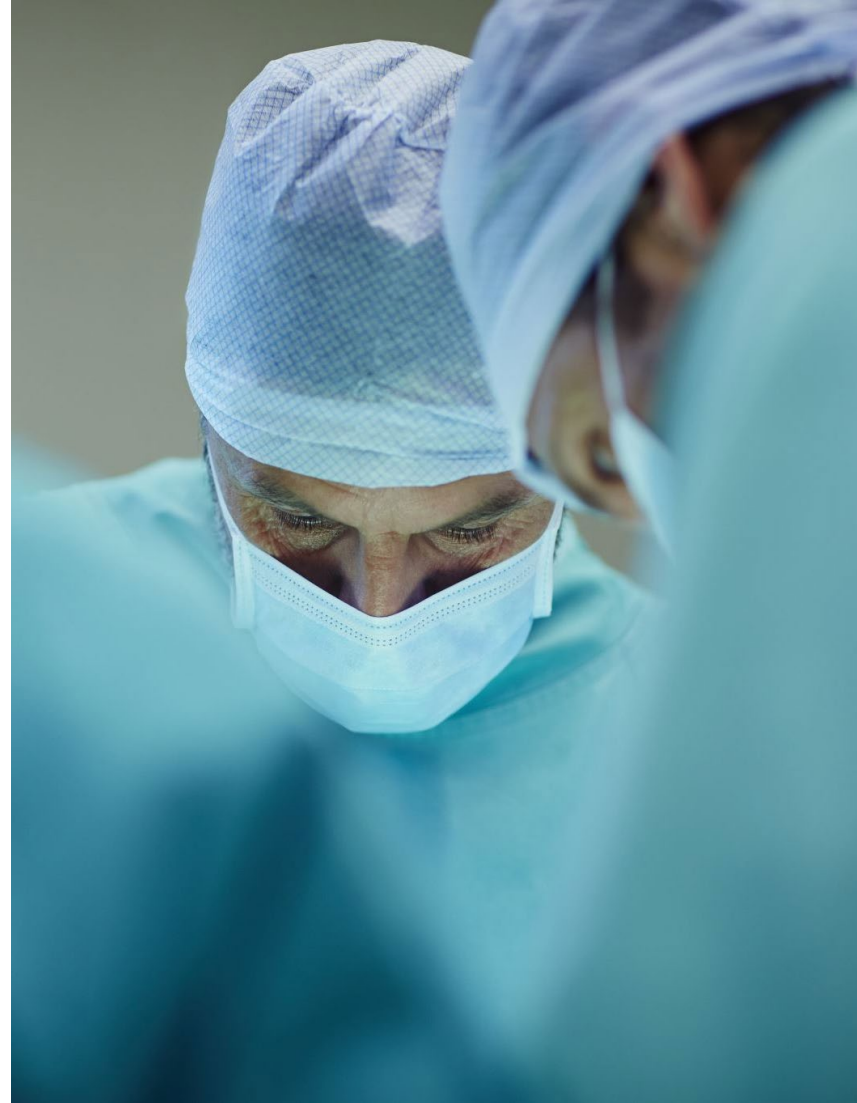
Clinical utility of the Braden scale for Predicting Pressure Sore Risk
B. J. Braden and N. Bergstrom Decubitus 1989 Vol. 2 Issue 3 Pages 44-6, 50-1

Guidelines for Pressure Injuries

- 3rd International pressure injury guideline from the international community and the National Pressure Injury Advisory Panel (NPIAP) released in March 2019.
- E version:
[http://www.internationalguideline.com/static/pdfs/Quick Reference Guide-10Mar2019.pdf](http://www.internationalguideline.com/static/pdfs/Quick%20Reference%20Guide-10Mar2019.pdf)
- Much of wound care lacks a strong evidence base.
- **Prevention and Treatment of Pressure Ulcers/Injuries (2019 guidelines)** gives some strength of evidence.

Case One

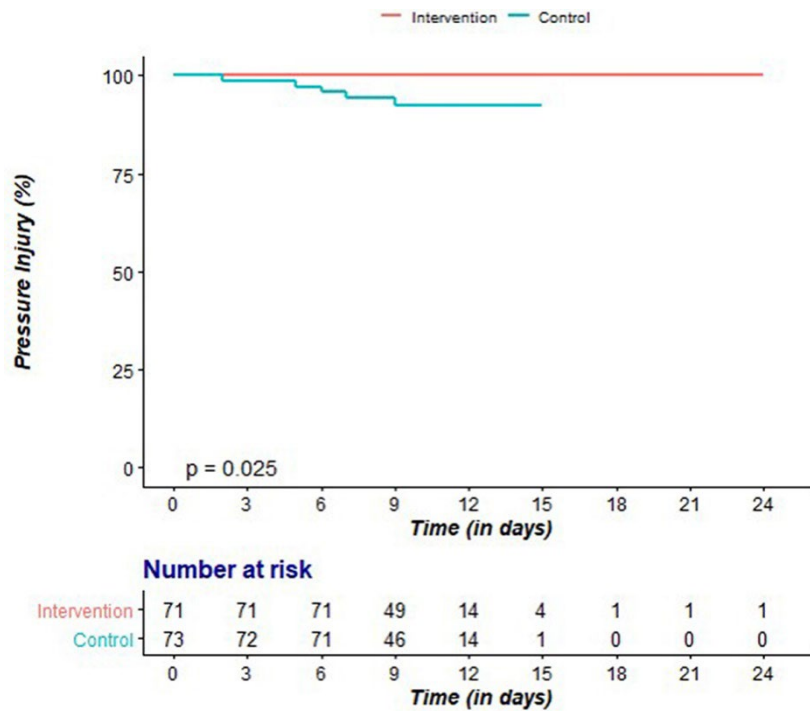
- 78-year male presents to the hospital with new fall and pain in the left hip region. He has a history of smoking and COPD but is active and lives independently.
- Braden score 23 (abnormal <11)
- He undergoes a total hip arthroplasty.
- Question: Are there methods to prevent pressure injury in the hospital?



Study of Foam Dressing for prevention of Pressure injury

- Effect of a prophylactic dressing for sacral pressure injuries in non-critically ill patients after general surgery: A randomized controlled trial
- PMID: 37183386, Yeo, 2023
- Randomized trial to determine incidence of pressure injury in patients using a 5-layer foam border dressing on the sacrum after general surgery and those with usual care
- Premise: treat pressure injury before it happens
- N is 144 patients with average age of 52.1 years
- Single site trial in Seoul, South Korea
- 1:1 randomization. No report of race, ethnicity, SES status
- Outcome: incidence of pressure injury in 8 days of hospital admission
- Tertiary care hospital

Results of Border Dressings



Ulcer development: at 24 days: 5 ulcers in 73 patients and none in 71 treatment patients (p 0.025)

Other significant predictor was Braden scale

After adjustment for Braden scale, OR of border dressing treatment was 0.48 (95% CI 0.24-0.99)

Summary

Use of a border foam dressing before surgery may help reduce pressure ulcers in 24 days following surgery

Small study

Single site

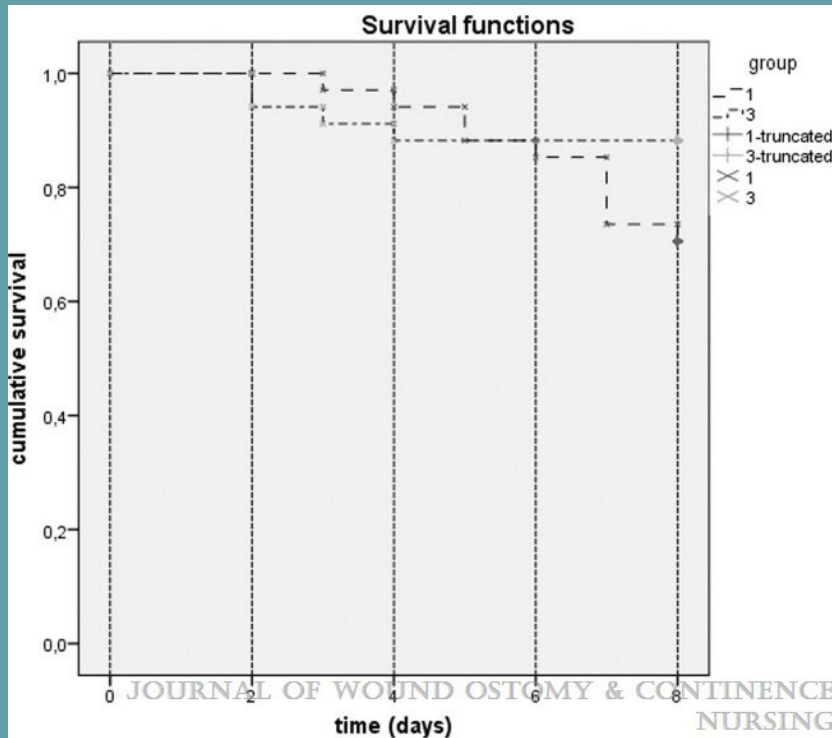
No DEI information

? Blinding/ bias

Foam Dressing to Prevent Pressure Injury in hospital patients with Hip fracture

- Effectiveness of Multilayered Polyurethane Foam Dressings to Prevent Hospital-Acquired Sacral Pressure Injuries in Patients With Hip Fracture: A Randomized Controlled Trial
- Gazineo, et. Al. 2020, PMID: 33201144
- Randomized trial to determine incidence of pressure injury in patients using a 12.9 cm multilayer foam border dressing on the sacrum in patients hospitalized with hip fracture and those with usual care
- Premise: treat pressure injury in hip fracture before it happens in hip fracture.
- N is 68 patients with average age of 83.8 years in intervention and 84.5 in control
- Single site trial in Bologna, Italy
- 1:1 randomization with blocks of 10. No report of race, ethnicity, SES status
- Tertiary care hospital (1500 bed)

Results



- In 34 intervention, 7 developed stage 1 or 2 Pressure injury compared to 1 pressure injury which was non-significant ($p=0.054$) (note more injuries in intervention)
- No differences between groups at baseline.
- Summary: although non-significant higher pressure injury in intervention
- Small study, localized wound care, No DEI

Overall summary on Preventative Pressure Dressings

Generally small studies in single centers looking at using foam dressings to prevent pressure injury

Considerations: often used during surgery or in the hospital setting

Little or no risk stratification (apply to only high risk patients?)

Some degree of cost with prevention

Local pressure injury prevention plans vary in different hospitals

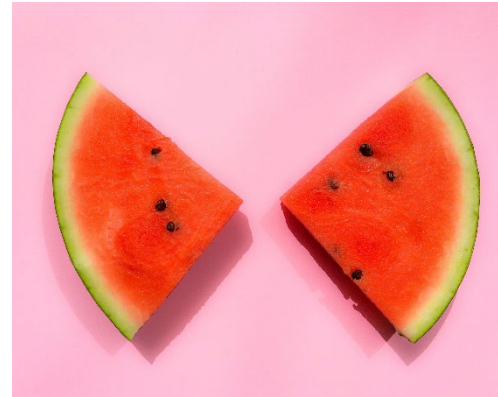
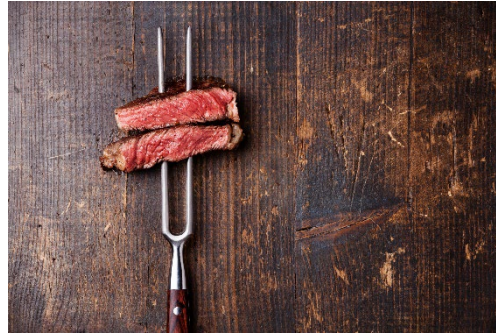
Different plans in different settings like long term care, community

Case Two

- 83 y/o female resident in LTC has ongoing stage 2 pressure ulcer
- PMH: history of PMR, back pain, hypertension, osteoporosis.
- Exam: 43 kg, 100/68 bp. Stage 2 pressure ulcer on buttock region.
- Clinical question: What can we do about the nutrition? What is the evidence of effectiveness?



Nutrition



ARS QUESTION 2

Use this WF2464754 for your Audience Response (ARS) portion of your presentation. This format meets the requirements of MOC and AV.

What is an optimal method to improve nutrition in at-risk older adults

1. Discontinue restrictive diets
2. Encourage favorite foods
3. Nutritional supplements
4. All the above.

QUESTION 2

- Discontinue restrictive diets
- Encourage favorite foods
- Nutritional supplements
- **All the above.**



3rd International guidelines

Nutritional support: Guidelines

3rd edition guidelines recommend assessment and nutritional screening (B2)

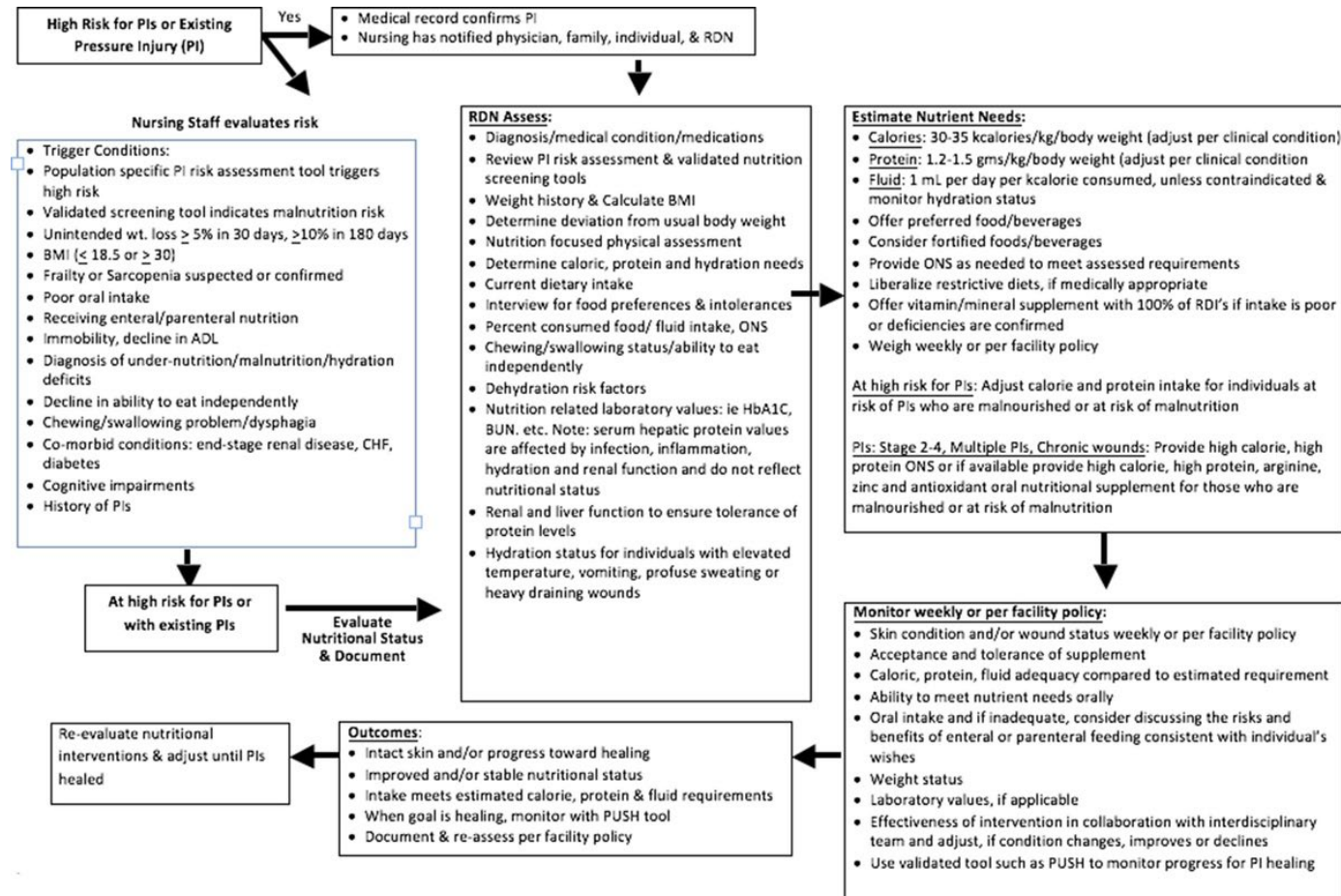
Develop a nutritional care plan (B2)

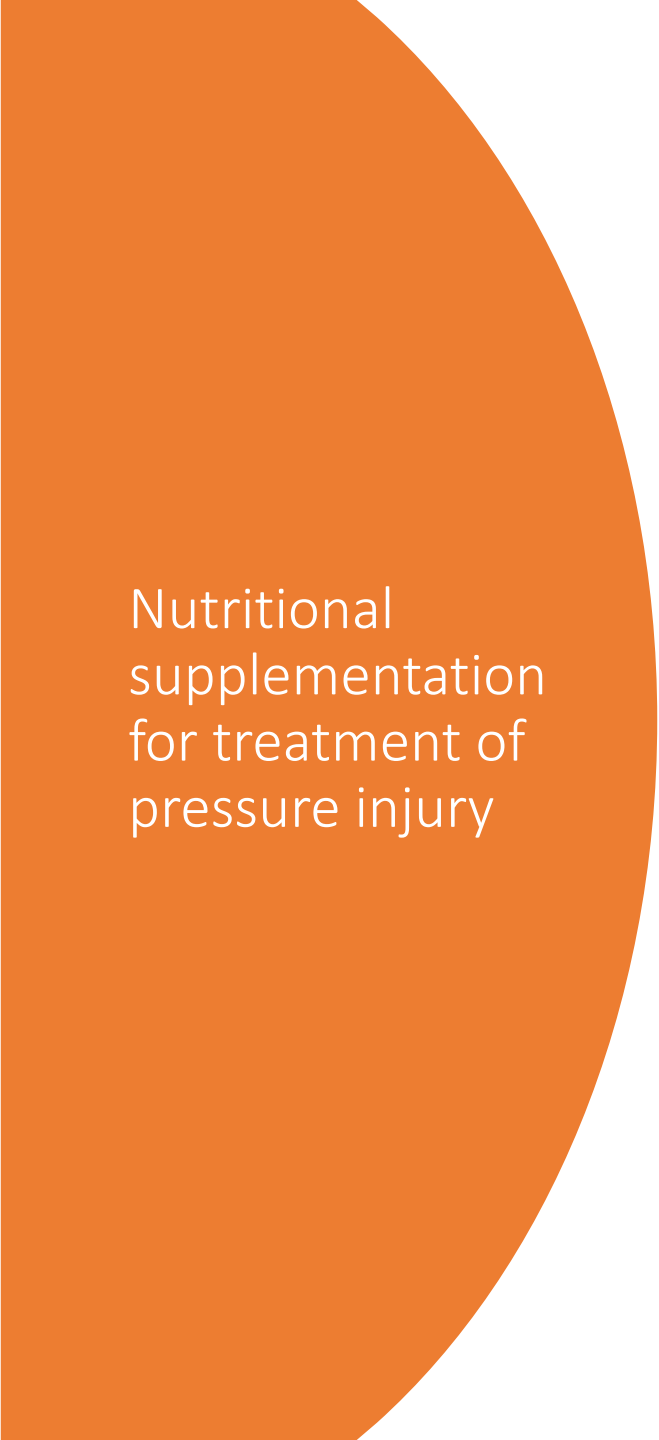
Each resident requires 30-35 kcal/kg*day with 1.25-1.5 g/kg*day of protein(B1)

Recommend high calorie and nutritional supplements in patients with pressure injury and malnutrition (B1)

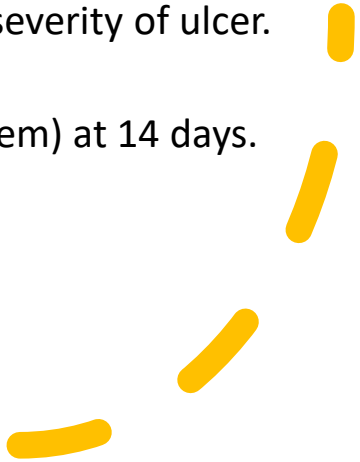
Discuss tube feeding (risks and benefits) as good clinical practice (no grade of evidence)

Flow Diagram for assessment





Nutritional supplementation for treatment of pressure injury

- Effect of supplements/intensive nutrition on pressure ulcer healing: a multicentre, randomized controlled study
 - Banks, 2023: PMID: 37094924
 - Randomized trial to determine wound healing of pressure injury in patients hospitalized with one or more pressure injury. Patients received nutritional supplementation versus usual care.
 - Premise: Treating and optimizing nutrition helps wound healing in patients with stage 2 or higher-pressure injuries.
 - Intervention: either nutritional optimization (30 kcal/kg) or wound supplement drink or usual care.
 - N is 131 patients with average age of 66.1 years and 57% male and 38.5% malnourished at baseline.
 - Five site trial in Australia
 - 1:1:1 randomization with stratification by severity of ulcer. No report of race, ethnicity, SES status
 - Outcome: PUSH score (wound scoring system) at 14 days.
2nd: wound size
- 

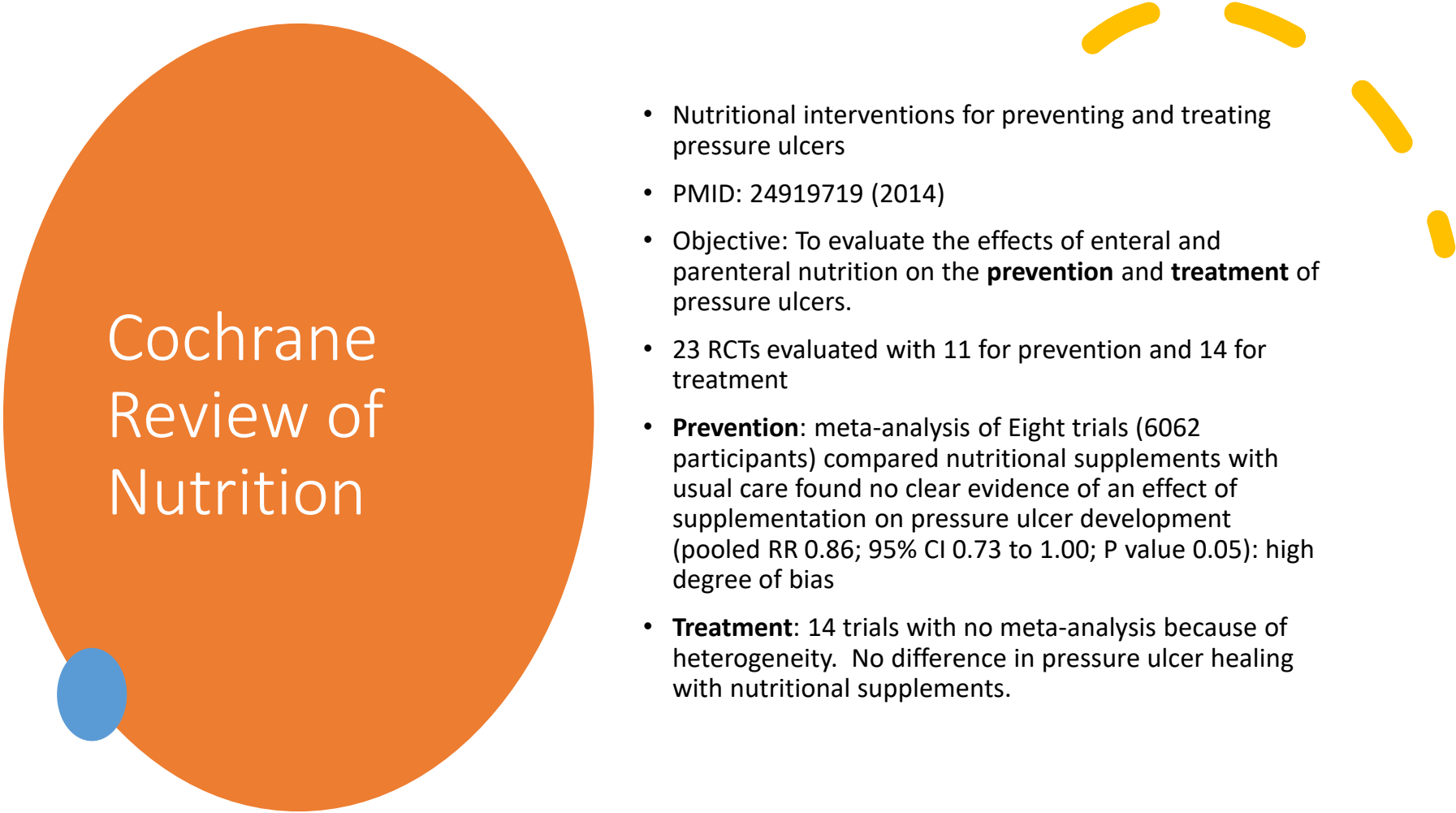
DATE	1/3	1/17	1/30
Area Score	7	5	3
Exudate score	2	1	1
Tissue type	2	2	2
Total Score	11	8	6
Score			
12			
11	x		
10			
9			
8		x	
7			
6			x

PUSH Tool

- Three elements:
- Area (length x width) score 0-10
- Exudate (none to heavy) score 0-3
- Tissue 0-4 (closed to necrotic material)
- Total score 0-17

Results:

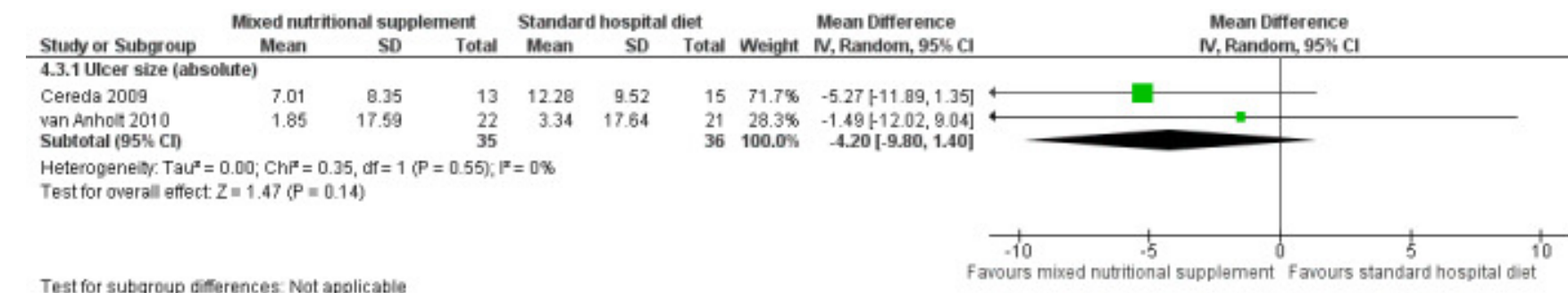
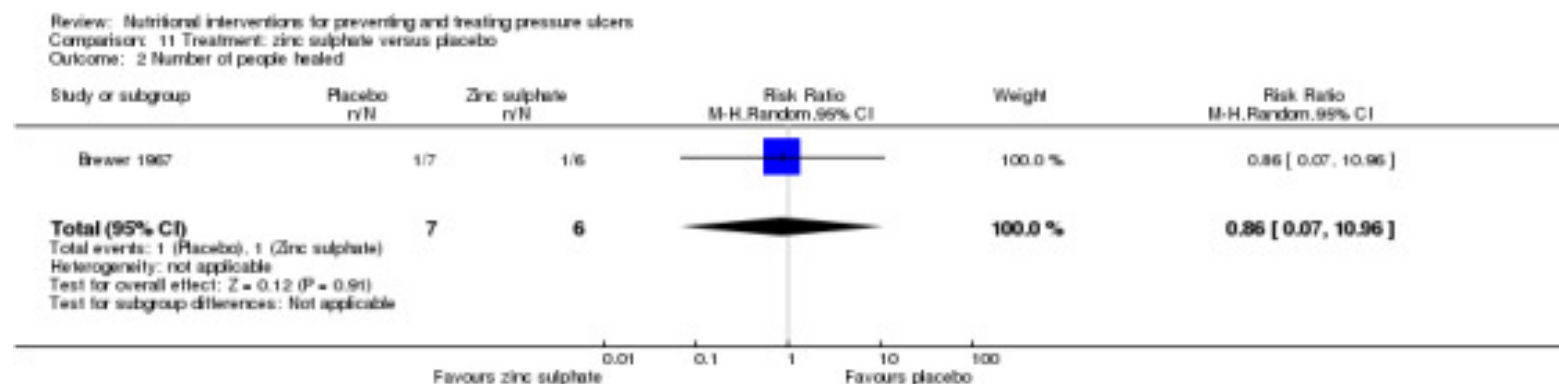
- 131 total participants with no differences in PUSH scores at 14 days
 - Standard -2.8 ± 3.2
 - Intensive -3.3 ± 3.1
 - Supplement -2.5 ± 3.6
- Intensive group only received about 50% of full nutritional support
- Supplement group did not get many of the supplements
- Multicenter study
- Small, underpowered
- Emphasizes challenges of weight treatment
- May raise some questions about importance of nutrition



Cochrane Review of Nutrition

- Nutritional interventions for preventing and treating pressure ulcers
- PMID: 24919719 (2014)
- Objective: To evaluate the effects of enteral and parenteral nutrition on the **prevention** and **treatment** of pressure ulcers.
- 23 RCTs evaluated with 11 for prevention and 14 for treatment
- **Prevention:** meta-analysis of Eight trials (6062 participants) compared nutritional supplements with usual care found no clear evidence of an effect of supplementation on pressure ulcer development (pooled RR 0.86; 95% CI 0.73 to 1.00; P value 0.05): high degree of bias
- **Treatment:** 14 trials with no meta-analysis because of heterogeneity. No difference in pressure ulcer healing with nutritional supplements.

Sample of Forrest Plots on Treatment



Practical Tips

Assess and develop a nutritional strategy for all short term and long- term residents with a pressure injury or at risk for pressure injury.

Document the weight issues and nutritional intervention

Discuss with family the challenges of weight issues and the possibilities of continued weight loss

Eliminate all restrictive diets

Possible palliative care discussions

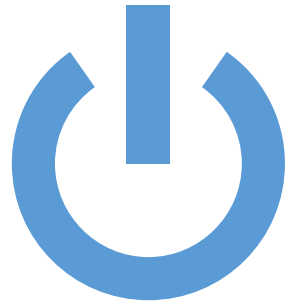
Case Three

85 y/o patient with CAD, DJD hips and spinal stenosis. Lives in a CCC and is currently in the skilled section.

Hx: she has gait problems with the spinal stenosis, she uses the motorized cart to get around.

Exam: Stage 2 pressure ulcer (little depth)

Clinical Question



What is the utility of a turning schedule in this SNF patient? How often should she be turned.



Do different Mattresses impact treatment and prevention of pressure ulcers?

Guidelines for Repositioning 3rd International Guidelines

- Repositioning should be undertaken for at risk individuals (B1)
- Repositioning frequency to be determined by tissue tolerance and clinical condition and individual characteristics (B2)
- Use manual handling to avoid sheer forces (B2)
- Keep the head of the bed flat (B1)
- Promote seating in appropriate chair or wheelchair for limited periods of time (B1)

Guidelines for Support Surfaces 3rd International Guidelines

- Use a high Specification reactive foam mattress or overlay in high-risk individuals. (B1)
- Consider using an alternating pressure air mattress or overlay for high-risk individuals (B1)
- Consider using air-fluidized bed for stage III or stage IV ulcers. (B1)
- Consider using a pressure reduction cushion for chair or wheelchair and nose patients at risk for pressure ulcer. (B1)
- Consider using an alternating air cushion for those patients in a wheelchair or chair for prolonged periods of time. (B1)

Cochrane Review of Turning schedules

- Gillespie BM, et. Al. 2020 Cochrane Database: PMID: 32484259
- Update on 2014 Cochrane Review
- 8 trials with 3941 residents (acute and long term care)
- 3 trials with pooled data for 2 versus 4 hour turn schedule
- $I^2 = 45\%$; pooled risk ratio (RR) 1.06, 95% confidence interval (CI) 0.80 to 1.41)
- Findings: unclear if 2 versus 4 hour is superior or inferior to each other

Take home Points from Turning

- Still unclear what optimal turning schedule should be
- It is not certain that a 2 hour turning schedule is superior
- Important to make sure the patient is turned and documented
- Important to monitor

Settings: any health setting

Intervention: 2-hourly repositioning on any support surface

Comparison: 4-hourly repositioning on any support surface

Outcomes	Illustrative comparative risks* (95% CI)		Relative effect (95% CI)	Heterogeneity	No. of participants (studies)	Certainty of the evidence (GRADE)	Comments
Pressure injury (stages 1 to 4) Short-term follow-up, 4 weeks or less	4-hourly	2-hourly	RR 1.06 (0.80 to 1.41)	Chi ² = 3.65, df = 2, (P = 0.16), I ² = 45%	1074 (3 RCTs)	⊕⊖⊖⊖ Very low¹	It is uncertain whether 2-hourly repositioning compared with 4-hourly repositioning used in conjunction with any support surface increases or decreases the incidence of pressure injury.
	116 per 1000	117 per 1000 (91 to 146)					
Health-related quality of life	Not estimable - outcome not measured or reported for this comparison.						
Procedural pain	Not estimable -outcome not measured or reported for this comparison.						
Patient satisfaction	Not estimable - outcome not measured or reported for this comparison.						
Costs	• 1 RCT, 967 participants • A cost-minimisation analysis compared the costs of 3-hourly and 4-hourly repositioning with 2-hourly repositioning schedule amongst nursing home residents. • The cost of repositioning was estimated at CAD 11.05 and CAD 16.74 less per resident per day for the 3-hourly or 4-hourly regimen respectively, compared with the 2-hourly regimen. • The estimates of economic benefit were driven mostly by the value of freed nursing time. The analysis assumed that 2-, 3-, or 4-hourly repositioning is associated with a similar incidence of PI, as no difference in incidence was observed.						
Incremental costs	Not estimable						

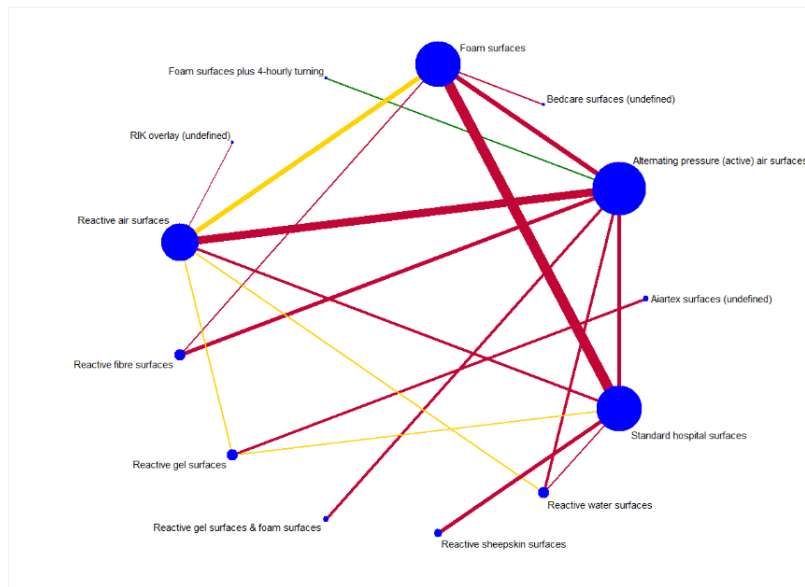
*The basis for the **assumed risk** (e.g. the median control group risk across studies) is provided in footnotes. The **corresponding risk** (and its 95% CI) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).

CI: confidence interval; RCT: randomised controlled trial; RR: risk ratio.

Brief Overview of Mattresses Prevention

Figure 2

[Open in figure viewer](#)



Prevention network: network plot for the base-case network for pressure ulcer incidence outcome. We weighted node (circle) size by the number of studies reporting each intervention and weighted the thickness of the edge lines according to the inverse variance of the treatment effect estimates for the direct evidence contrast. We indicated the overall risk of bias for each direct comparison in the network diagram, using colour for three risk of bias ratings: low (green), unclear (yellow), and high (red).

2021 Cochrane review of Cochrane reviews of 6 Cochrane reviews with 40 studies in a network analysis:

Reactive air surface better than foam. foam surfaces (reference treatment), (risk ratio (RR) 0.46, 95% (CI) 0.29 to 0.75),

Alternating pressure (active) air surfaces (e.g. alternating pressure air mattresses, large-celled ripple mattresses) (RR 0.63, 95% CI 0.42 to 0.93),

Reactive gel surfaces (e.g. gel pads used on operating tables) (RR 0.47, 95% CI 0.22 to 1.01) may reduce pressure ulcer incidence.



Mattresses: Treatment

- Using Network analysis, 4 studies and six network contrasts
 - For complete ulcer healing: reactive air surface is borderline better than foam. (RR 1.32, 95% CI 0.96 to 1.80).
 - For healing, no clear superiority of one mattress over another.
 - Take home: All patients with high risk or with a pressure ulcer need specialized pressure reduction mattresses (low air loss, alternating pressure or air fluidized) (Shi 2021:PMID: 34398473)
-



Take home points



Turning schedule of every 2 hours is not evidence proven fact.



Some thoughts that pressure reduction and less frequent turns may be as effective if not more effective than typical schedules.



Standard of care remains every 2 hour turn schedule.



Pressure reduction mattresses are standard of care

Final General Concepts on Pressure Injury

- If your wound care plan is working (including topical) continue the plan
- If things are getting worse, make sure fundamentals are covered (offloading, nutrition, good wound management, clean)
- Document and discuss with patient/ family
- Change something
- Consider palliative wound care



Recommendations from 3rd International Guidelines for Dressings for Pressure Injury

Debridement of the ulcer (B2)

Using hydrocolloids for non-infected pressure injury (evidence B2)

Can use hydrogels for non-infected injury (evidence B1)

AMDA guidelines recommend hydrocolloids

Alginates for wounds with heavy exudates (evidence B1)

Use foams for pressure injury with heavy exudates (B1)

Advanced dressings

Collagen for advanced dressing (B1)

Platelet derived growth factors (B1)

Update on Using Negative Pressure Therapy

Negative pressure wound therapy for treating pressure ulcers

Shi: Cochrane Reviews 2023, PMID 3732410

How well does negative pressure therapy work compared to usual care.

8 randomized trials with 327 participants. High risk of bias. Median study size was 37. Only one study looked at complete wound healing. Many studies looked at wound size or PUSH scores.

Authors conclusion: Efficacy and safety of Negative pressure is uncertain but may speed reduction in wound size and severity.

Practical Conclusion on Pressure Injuries

- Little changes on the data; however, the 3rd International Guidelines from 2019 help with standards
- Review consensus guidelines on <http://www.internationalguideline.com/static/pdfs/Quick Reference Guide-10Mar2019.pdf>
- Other practical resources include AMDA guidelines on Wound care
- Document the care plan including nutrition, offloading, wound management.
- Use good communication skills for patients, family and the care team.

QUESTIONS & DISCUSSION



Please feel free to contact me at any time
on questions

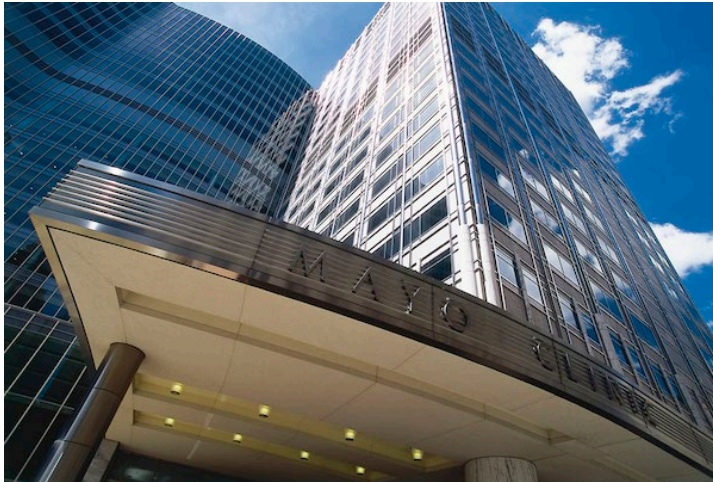
Talk with me after talk

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