

Nutritional Support to Geriatric Patients

Tommy Cederholm, MD, PhD, Professor

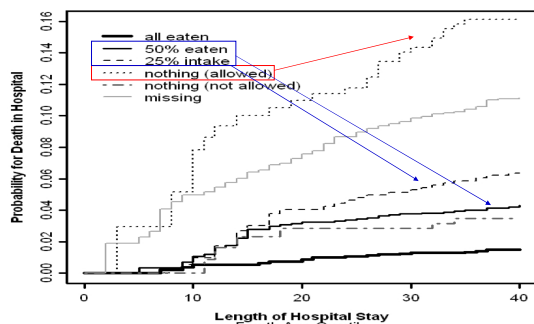
Clinical Nutrition and Metabolism,
Uppsala University,
Department of Geriatric Medicine,
Uppsala University Hospital,
Uppsala, Sweden



AKADEMISKA
SJUKHUSET

Poor eating in hospital ⇒ higher risk 3200 patients age 78–103 y (4th age quartile)

Adjusted Cumulative Incidence for Death in Hospital



Hiesmayer M. Clin Nutr 2009;28:484-91

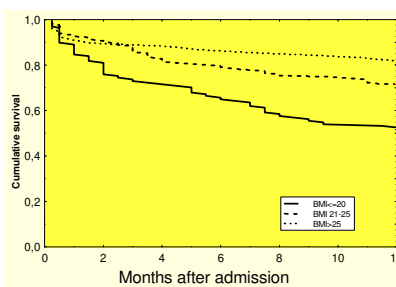
Energy intake by Swedish hospital patients

- >1000 patients at Uppsala University Hospital, ~65 y
- 24 h food registration
- Energy need: 30 kcal/kg/d (>70: 25 kcal/kg/d)
- Median intake 50-75 % of need
- **½ received <75% of energy need**
- **20% received <50% of energy need**



Wegener S. Pers comm.

Geriatric cachexia - 1-year survival decreases with lower weight (BMI)



- 400 patients (81 y)
- Independent predictors of mortality within 1 y
 - Body mass index
 - Gender
 - Function (ADL)

Age, Diagnosis

Flodin et al. Clin Nutr 2000;19:121-5

FOOD

...is one key to survival

Nutritional care process, part 1: Screen, assess and plan

1. Nutritional screening

- weight history
- body mass index
- eating difficulties/food intake
- co-morbidities

MNA-SF, NRS2002, SGA, MUST
according to local preferences

2. Nutritional assessment

Identify

- Causative factors (disease),
- Oral problems
- Meal-time difficulties
- Cultural, social or ethnic factors related to low food intake

3. Make a plan - calculate need of

- **Energy** 20-30 kcal/kg bw/d
- **Protein** 1-1.5 g/kg bw/d
- **Fluid** ~30 ml/kg bw/d

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ESPEN Guidelines Enteral nutrition: Geriatrics

Oral/enteral nutrition is recommended


- in undernourished/at risk subjects to
 - increase energy, protein and micronutrient intake
 - improve nutritional status and survival
- in frail elderly to
 - maintain nutritional status
- in hip fracture patients to
 - reduce complications
- to prevent and treat pressure ulcer
- in early dementia to
 - prevent undernutrition, but

avoid ONS/EN in terminal dementia

Volkert D et al. Clin Nutr 2006.

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Nutrition treatment (part 2) Options

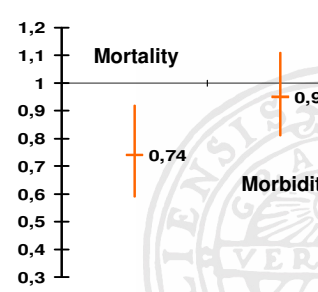


- ✓ **Nutrition**
 - **Oral supplementation**
 - Energy rich
 - Protein rich
 - Vitamin D
 - **Enteral nutrition**
 - NG sond
 - PEG
 - **Parenteral nutrition**
 - ✓ **Anabolic treatment**
 - BCAA, leucin
 - GH, Nandrolon,
 - SARM
- ✓ **Reduce catabolism**
 - Myostatin inhibitors - decoy receptors
 - Megesterol acetate
 - Proteasome inhibitors
 - ACE inhibitors
- ✓ **Immuno modulation**
 - n3 FA
 - Arginine
 - Glutamine
 - anti-oxidants
- ✓ **Physical activity**
 - Resistance training

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Protein and energy supplementation in elderly people and mortality – Cochrane Meta-analyses 2005

- 34 trials / 3021 randomized subjects
- 26% decrease in relative risk of death
- Mean weight gain 2.3% (1.3 kg)



Mortality: 0.95
Morbidity: 0.74

Milne, AC et al. Cochrane Database of Systematic Reviews. 2005.

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Oral Nutritional Supplementation (ONS) to older subjects - Mortality in recent meta analyses

Milne 2006: 55 studies; 9187
Total (95% CI) 4005
Total events: 400 (Treatment), 442 (Control)
Heterogeneity: Chi² = 23.03, df = 27 (P = 0.68); I² = 0.0
Test for overall effect: Z = 1.30 (P = 0.20)

Milne A et al. Cochrane 2009
19: 62 studies; 10187 patients
0.92 [0.81, 1.04]

Milne A et al. Ann Intern Med 2006;144:37-48
0.65 (0.41-1.02)

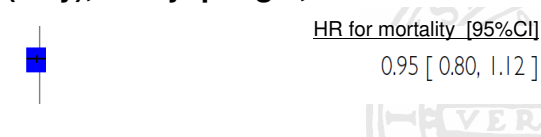
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Oral Nutritional Supplementation to older subjects

FOOD Trial (2005)

4000 well-nourished stroke patients (71 y), no dysphagia, treated for 6 mo

HR for mortality [95%CI]
0.95 [0.80, 1.12]



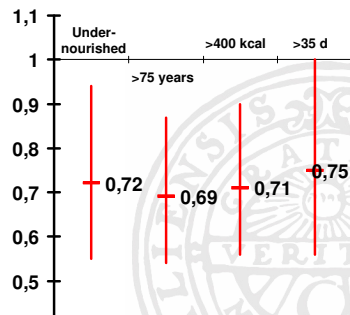
Dennis M et al. Lancet 2005;365:755

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Oral supplementation in older people - Mortality by subgroup

2006 - 55 trials/9216 randomized subjects:

- **Undernourished**
 - 21 trials/1825 subjects
- **Age >75 years**
 - 32 trials/2940 subjects
- **>400 kcal energy intake**
 - 31 trials/2905 subjects
- **>35 days of supplement**
 - 30 trials/2600 subjects



Under-nourished: 0.72
>75 years: 0.69
>400 kcal: 0.71
>35 d: 0.75

Milne, AC et al. Ann Intern Med 2006;144:37-48

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Protein and energy supplementation in elderly people at risk from malnutrition – meta analysis

Cochrane 2009
62 trials / 10.187 randomized subjects


Confirms results from 2006 e.g. :

ONS reduces

- mortality in undernourished (0.64- 0.97)
- mortality in geriatric (0.78 (0.62- 0.98)
- complications (0.86 (0.75- 0.99)

Milne Cochrane Database of Systematic Reviews. 2009

The geriatric patient is the biggest winner!



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ONS increases energy intake without displacing regular food

88 nursing home residents. RCT. ONS 300-500 kcal/day.
Effect related to nutritional status (MNA)

	WN No Suppl	At risk No Suppl	At risk Suppl	PEM Suppl
Day 0 (kcal/day)	1689±64	1584±60	1558±75	1489±59
Day 60 (kcal/day)	1632±72	1562±66	1764±117	1889±100
Suppl intake			393±25	430±19

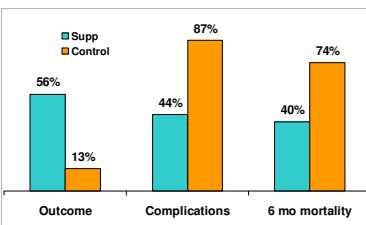
Lauque S et al. Age & Aging 2000;29:51

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Oral Nutritional Supplement (ONS) in elderly patients with fractured hip

59 hip fracture patients, RCT
ONS for 32 days; 254 kcal + 20 g protein

Delmi et al. Lancet 1990;335:1013



Outcome	Supp	Control
Outcome	56%	13%
Complications	44%	87%
6 mo mortality	40%	74%

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Improvement of ADL with nutritional supplementation in older subjects after discharge from geriatric wards

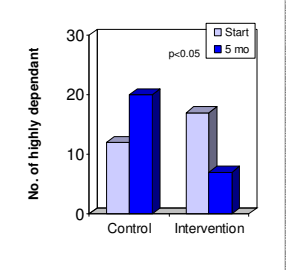
54 patients (RCT), 86±5 y

- Advice on fat intake ↑
- Protein supplementation
- Vitamin supplementation

5 mo follow-up

- Weight stability vs decrease
- Improved ADL function

Persson M et al. Clin Nutr 2007;26:216



Group	Start	5 mo
Control	~13	~21
Intervention	~18	~8

p<0.05

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Improved function with nutritional intervention in nursing-home residents

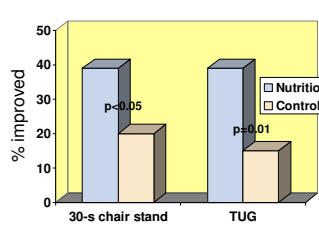
62 residents (RCT), 86 y

Nutrition supplementation
Exercise training
Oral care

11 weeks follow-up

- Weight increased (Δ~2kg)
- Improved balance

Beck A et al. Nutr 2008;24:1073-1080



Test	Nutrition	Control
30-s chair stand	~40%	~20%
TUG	~40%	~15%

p<0.05, p=0.01

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The Japanese Centenarian Study

1907 100-year-olds, 10% were independent, i.e. preserved ADL, intact cognition & high social status

Variables Linked to Successful Aging

- Good vision
- Protein intake ↑
- No falls
- Regular training
- No alcohol
- Good chewing ability
- Regular sleep
- Male

Ozaki JAGS 2007




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Behandling av sarkopeni

- Nutrition
- Reducera inflammation/katabolism
- Stimulera anabolism

✓ Nutrition

Näringsdrycker

Protein

AA – EAA/leucin?

n-3 fettsyror?

✓ **Styrketräning!**

Farmakoterapi

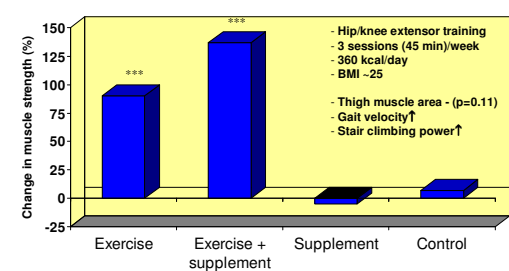
- ✓ Anti-inflammation
 - Megestrolacetat?
 - Proteasominhibitorer?
 - ACEi?
- ✓ Anabol behandling
 - Nandrolon, testosteron?
 - Myostatininhibitorer?
 - Selectiv Androgen receptor modifiers (SARM)?
 - Ghrelin?



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Muscle strength after exercise and nutrition

Effects of resistance training and liquid supplementation for 10 weeks on muscle strength in 100 frail elderly (87y) – RCT



Change in muscle strength (%)

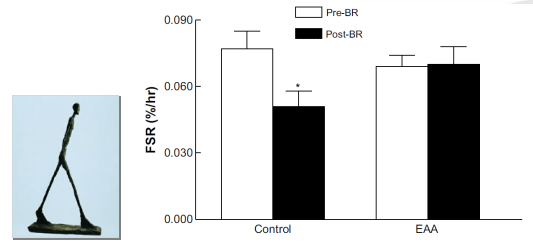
- Hip/knee extensor training
- 3 sessions (45 min)/week
- 360 kcal/day
- BMI ~25
- Thigh muscle area - (p=0.11)
- Gait velocity↑
- Stair climbing power↑

Flatarone et al. N Engl J Med 1994;330:1769

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Essential amino acids (EAA) prevent bed rest induced muscle wasting

22 healthy men ~70 y. Bed rest 10 d. EEA vs. placebo. EAA do not reduce appetite. Protein fractional synthesis rate (FSR) in muscle is maintained by EAA.



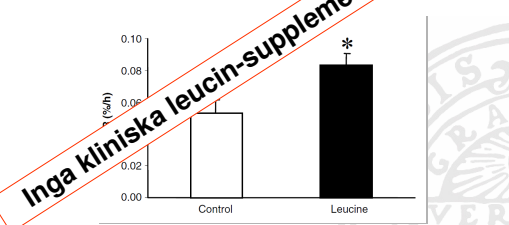
FSR (%/hr)

Ferrando et al. Clin Nutr 2010;29:18-23

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Leucintillförel ökar muskelbildning hos äldre

20 friska män, 70 år, BMI 25. Proteindryck med/utan leucin. Leucin ökade proteinsyntesen i muskler (p=0.001).



FSR (%/hr)

Rieu et al. J Physiol 2006;575:305-15

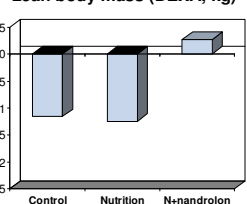
Inga kliniska leucin-supplementeringsstudier

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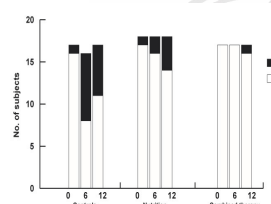
Nandrolone and protein supplementation in hip fracture

54 elderly lean women with hip fracture, RCT; 6 mo of nutritional treatment +/- nandrolon and 6 mo follow-up

Lean body mass (DEXA, kg)



Katz ADL index



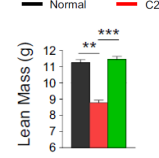
Tidemark et al. Clin Nutr 2004;23:587-96

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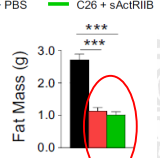
Myostatin decoy receptor reverse cancer cachexia and sarcopenia

- Myostatin blocks muscle growth via ActRIIB binding
- sActRIIB act as a decoy receptor and "inactivate" myostatin
- sActRIIB administration to cancer cachectic C26 rats
 - Reversed muscle wasting
 - Protected cardiac muscle
 - Prolonged survival

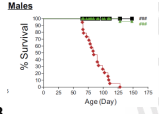
Lean Mass (g)



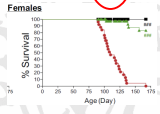
Fat Mass (g)



Males % Survival



Females % Survival



Zhou et al. Cell 2010;142:531-43



Nutritional care process, part 3: Monitor nutritional treatment

- Weight measurements regularly
- Registration of food/energy intake
- Biochemical follow-up usually not necessary
 - ✓ se-prealbumin or se-IGF-1 could be considered
- Functional follow-up more adequate
 - ✓ e.g. gait speed or grip strength
- Transfer information on nutritional treatment



Summary of nutritional care process

- **Screening and assessment**
 - 24 – 48 hours - hospital and geriatric care
 - 1 week - elderly care
- **Care plan - calculate energy need**
- **Nutritional treatment**
 - at least 75% of calculated energy need - acute care
 - >100% of calculated energy need - rehabilitation care
 - 100% (if not palliative or terminal) - elderly care
- **Monitor and transfer of information**



Good progress in Sweden

- **Socialstyrelsen**
 - Föreskrift, "Vägledning" - hösten 2011
- **Sveriges Kommuner och Landsting**
 - Nationella Åtgärdsprogram för ökad patientsäkerhet
 - "Åtgärdsprogram för att förebygga undernäring"
- **Regeringen - Socialdepartementet**
 - Nationellt kvalitetsregister; alla >65 år
 - SeniorAlert - Trycksår, Fall, Undernäring
 - Varje registrering ger pengar



Conclusions

Clear benefit of ONS on mortality and complications

Benefit increases when

- Undernourished subjects are targeted
- Subjects are older than 75 years
- Intake is > 400 Kcal
- Duration is greater than 35 days
- Hospitalized and sicker subjects are targeted
- Geriatric conditions

Combine nutrition and exercise → enhanced effects

Large benefit vs. the relatively small cost of feeding



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Combine nutrition and exercise → enhanced effects

Large benefit vs. the relatively small cost of feeding

Starvation is not acceptable!
Thank you



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