TDR and vitamin D status in elderly obese people with osteoarthritis of the knee

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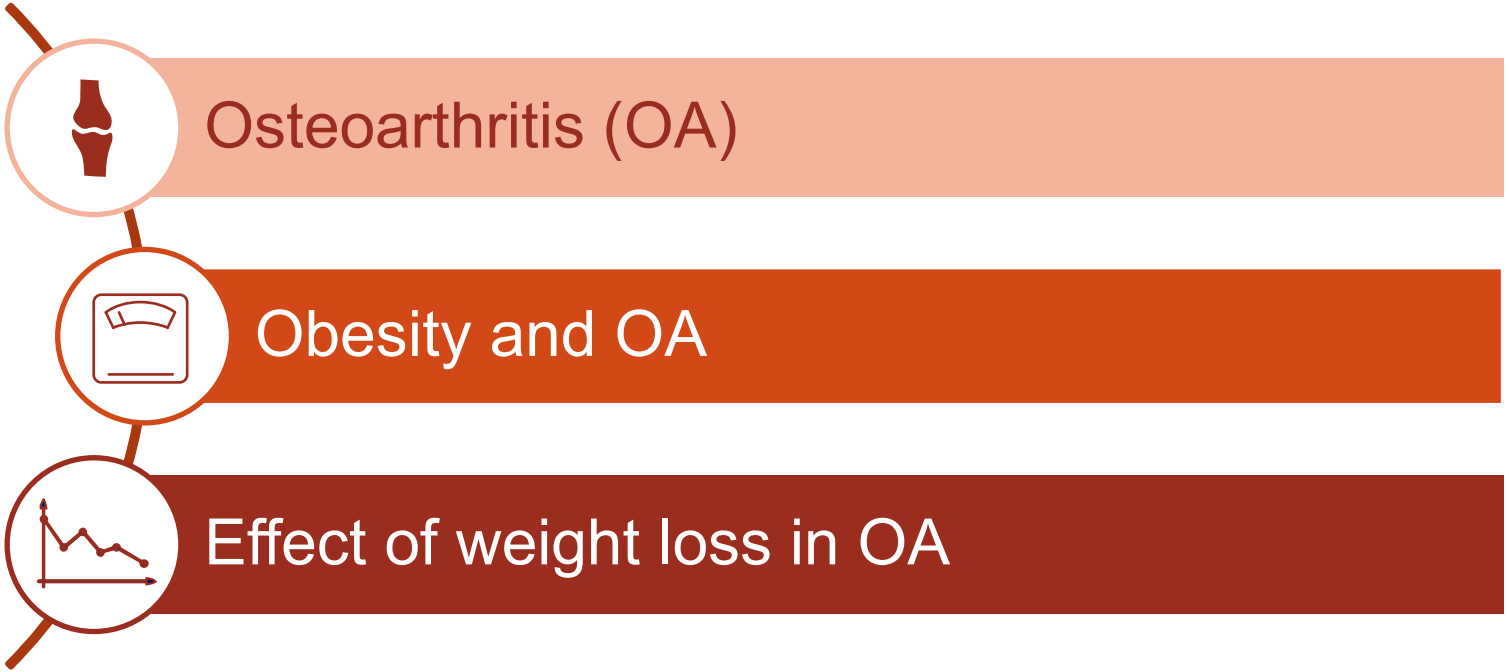
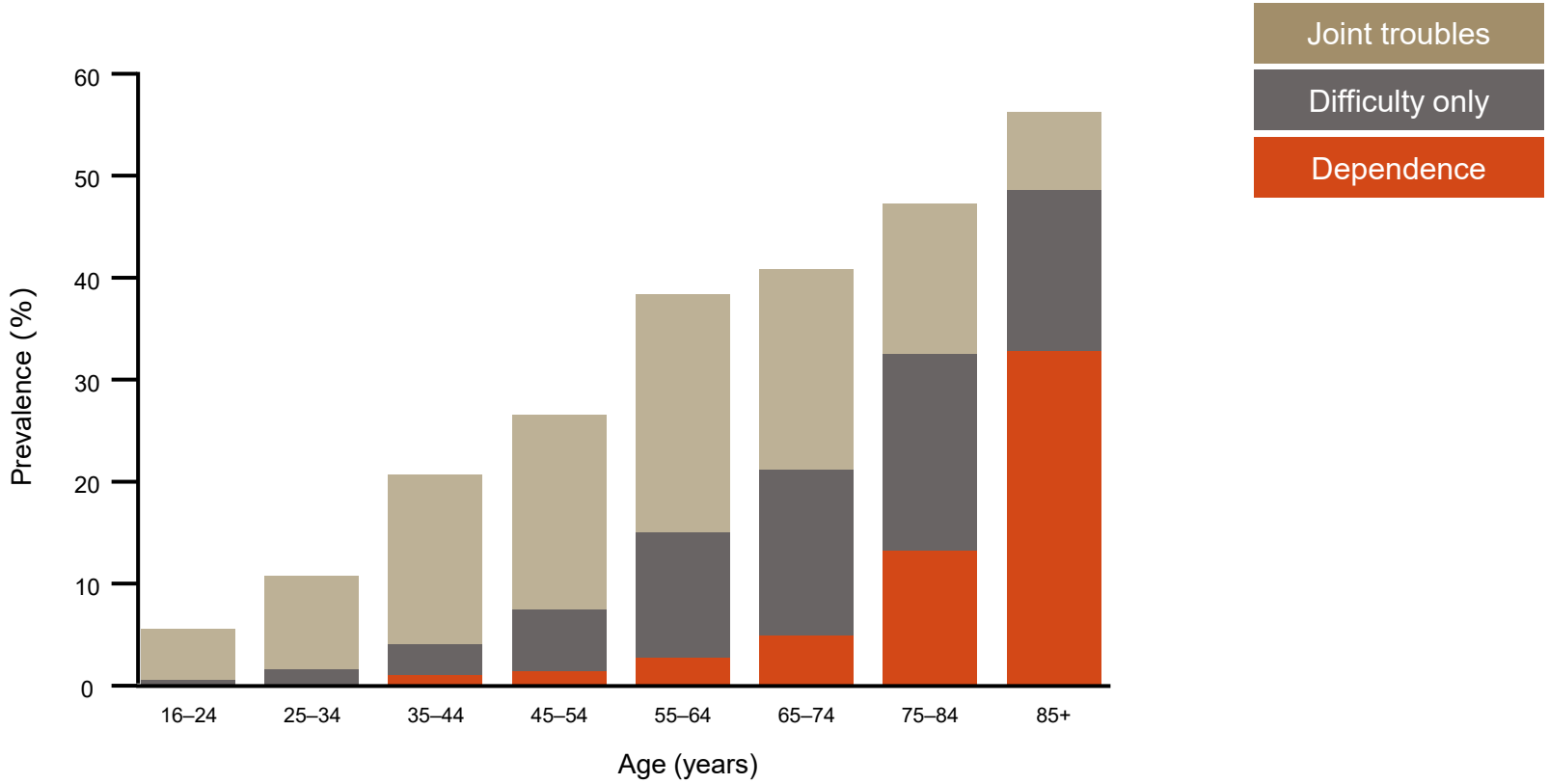
Session outline

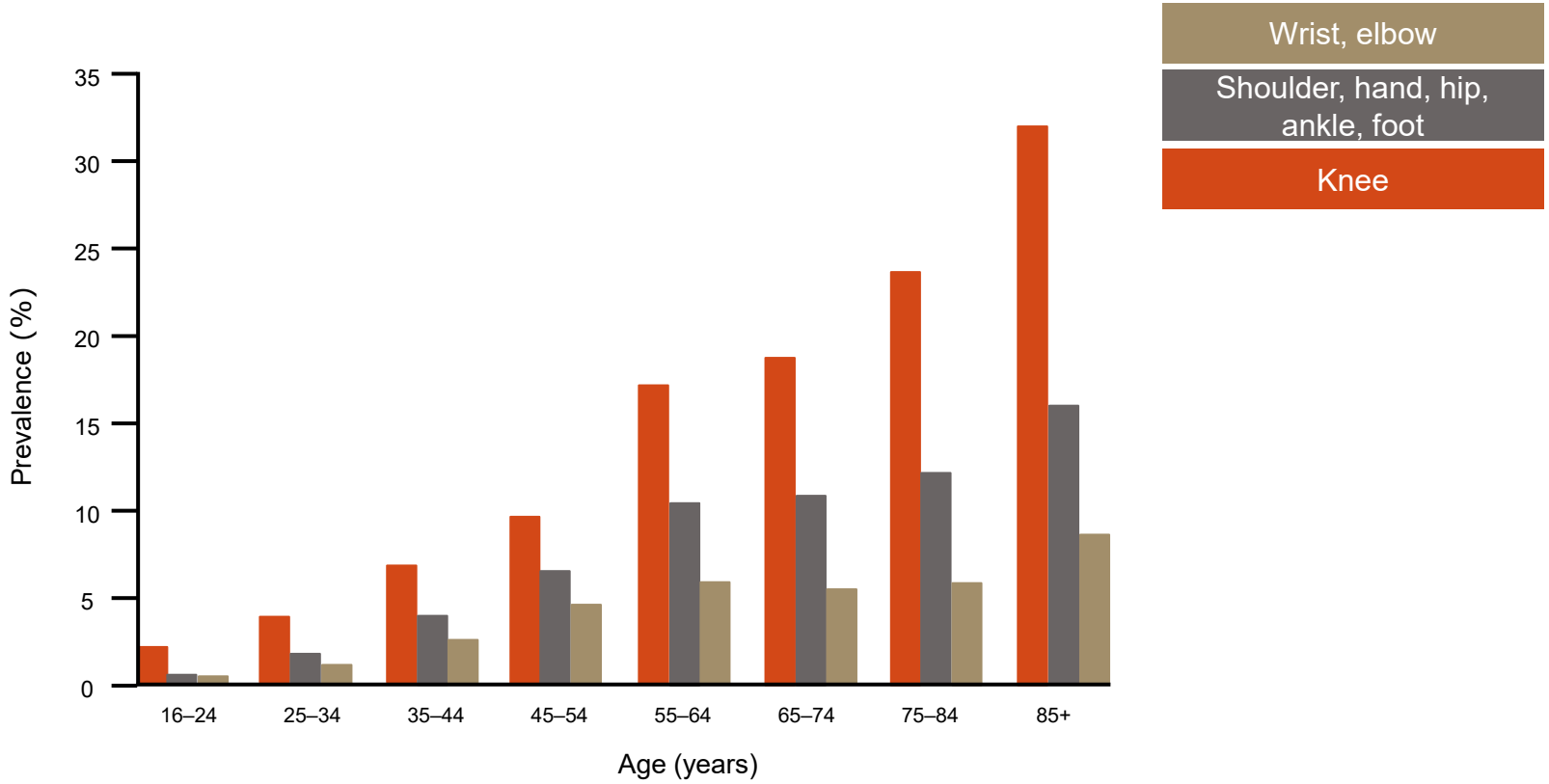


Joint troubles increase with age



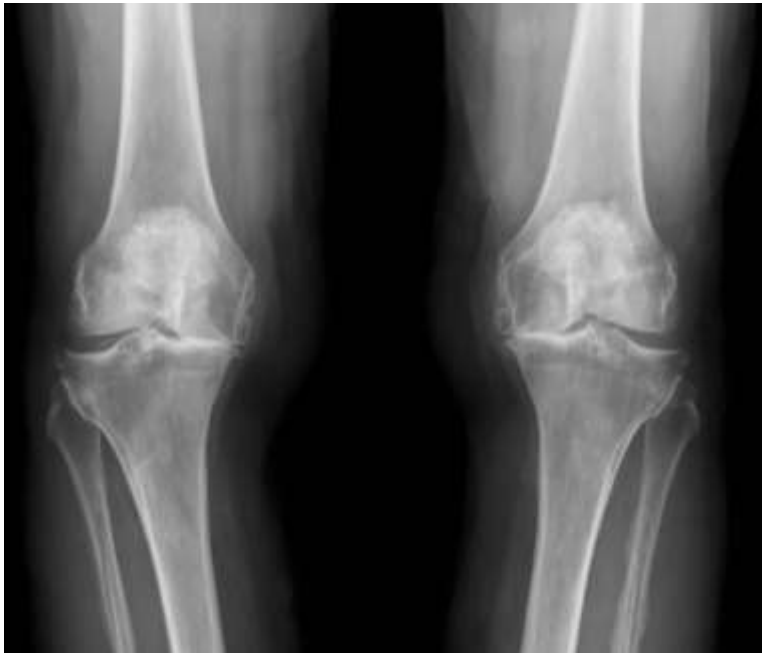
Calderdale-study. Badley & Tennant. *Ann Rheum Dis* 1992;51:366–71

In the end, it's all about knees



Calderdale-study. Badley & Tennant. *Ann Rheum Dis* 1992;51:366–71

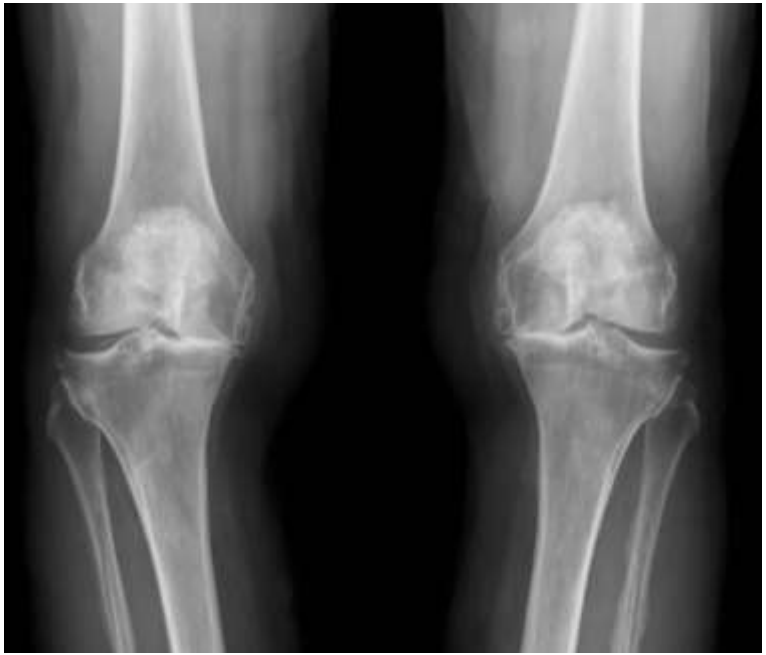
Osteoarthritis: Symptoms



- Pain
- Stiffness
- Loss of function

Kellgren & Lawrence. *Ann Rheum Dis* 1957;16:494; Glyn-Jones *et al. Lancet* 2015:386:376–87

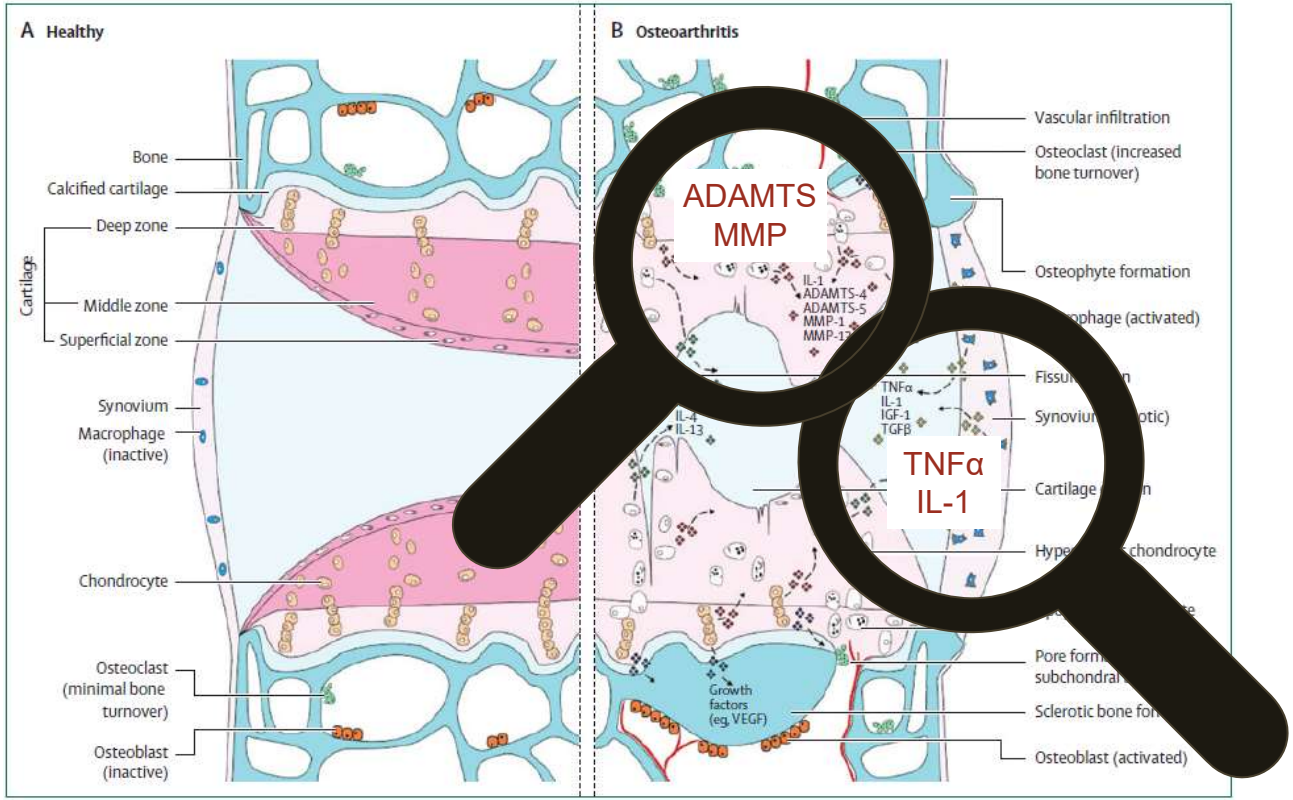
Osteoarthritis: Kellgren Lawrence Grading



- Grade 1: uncertain changes, osteophyte beginning to form
- Grade 2: light changes, definite osteophyte formation
- Grade 3: moderate changes, osteophytes + joints space narrowing
- Grade 4: severe changes, osteophytes + abolished joints space (bone-on-bone)

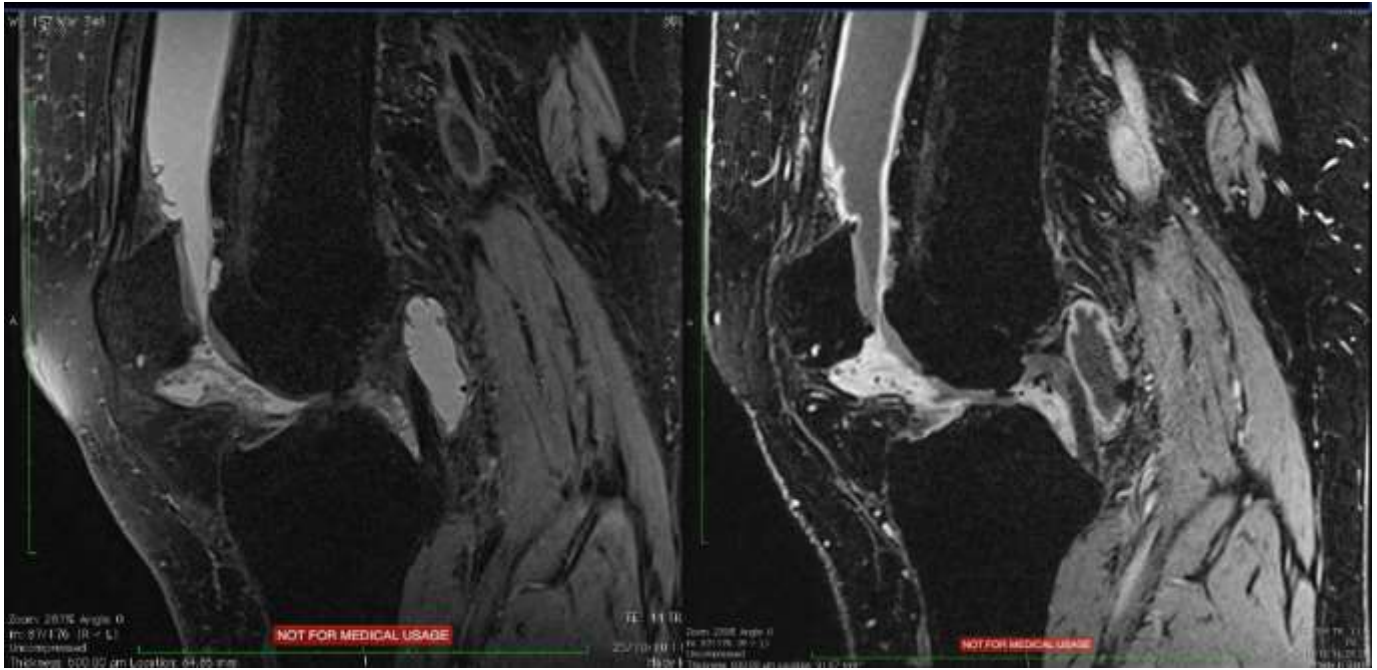
Kellgren & Lawrence. *Ann Rheum Dis* 1957;16:494; Glyn-Jones *et al. Lancet* 2015:386:376–87

Inflammation in OA



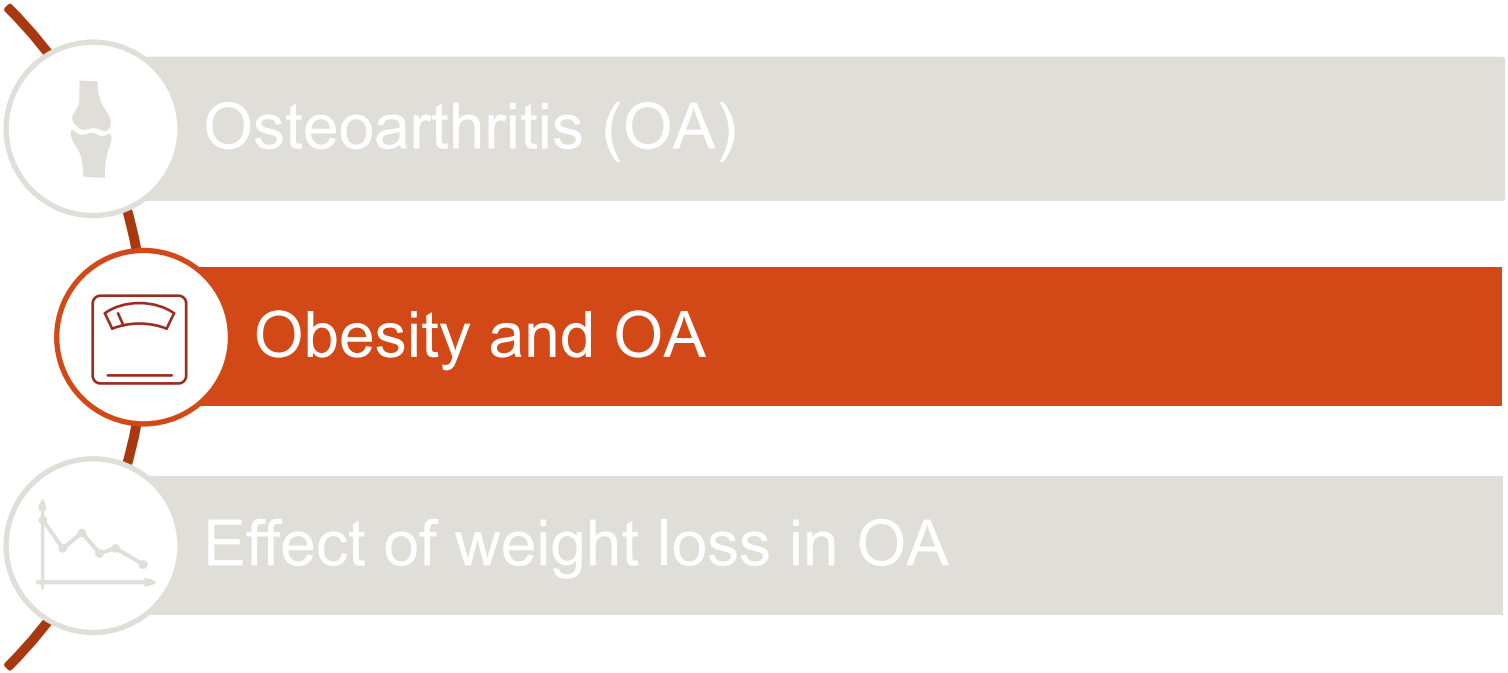
Glyn-Jones *et al. Lancet* 2015:386:376–87

Inflammation is the main cause of pain in knee OA

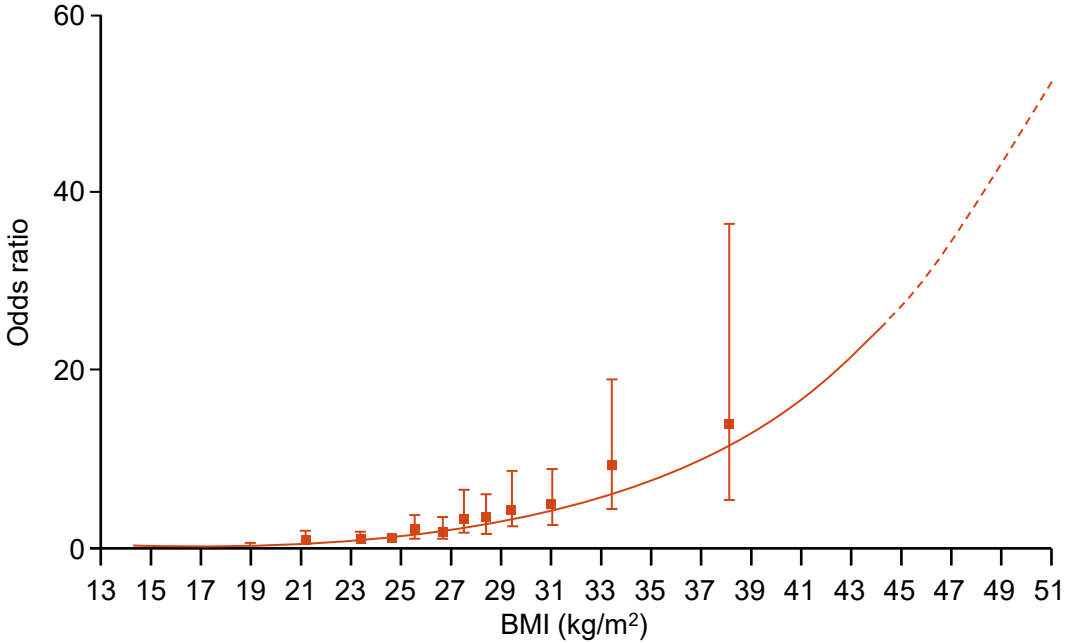


Ballegaard *et al*. *OAC* 2014;22:933–40

Session outline



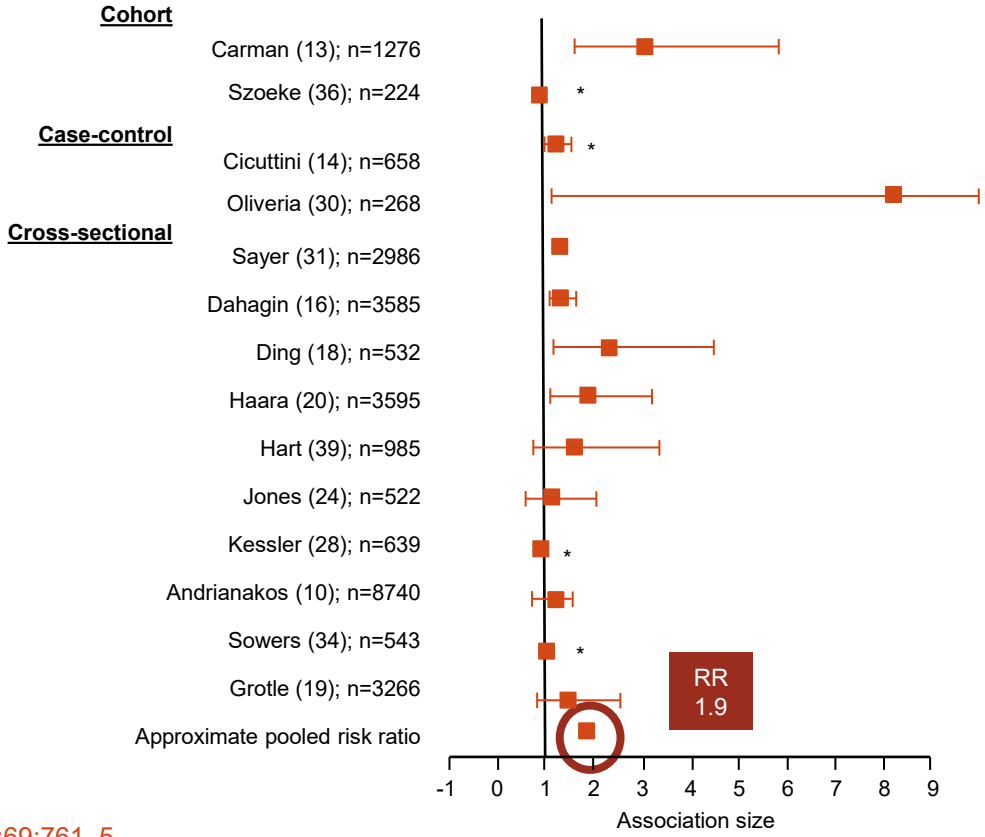
The risk of knee OA increases with obesity



In women with a BMI >27, the risk of knee OA increases by 15% per BMI point[2]

1. Coggon *et al. Int J Obesity Rel Metab Disord* 2001;25:622–7; 2. Anderson & Felson. *Am J Epidemiol* 1988;128;179–89

Non weight bearing joints also at risk from overweight



Yusuf. *Ann Rheum Dis* 2010;69:761–5

Session outline

Weight loss is the first recommendation in any guideline for knee OA

‘State of the art’ seminar on OA by Professor Glyn-Jones
Published in *The Lancet* in 2015

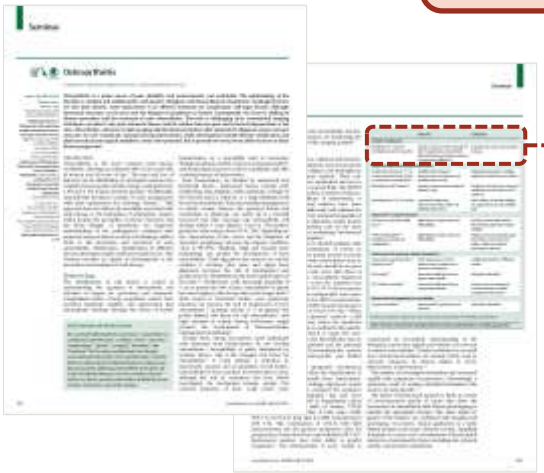
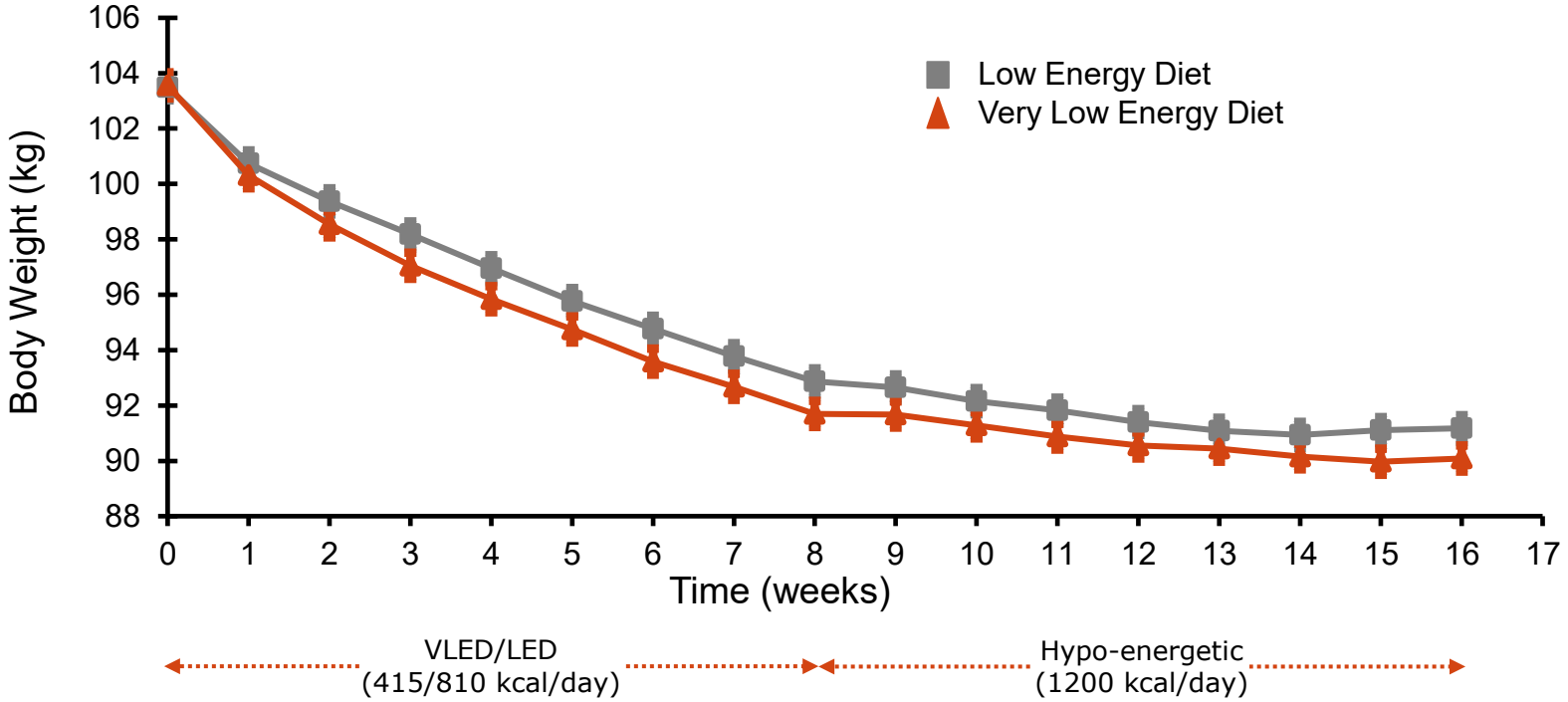


***Table*: Summary of treatment strategies that have shown potential disease-modifying properties**

	Outcome	Comments
Lifestyle modification		
Weight loss;[95-98] exercise[99] (strength and aerobic capacity)	Symptom improvement and reduced risk of symptomatic osteoarthritis MRI and biochemical marker evidence of structural modification	Potential role as primary prevention strategy

Glyn-Jones *et al. Lancet* 2015;386:376–87

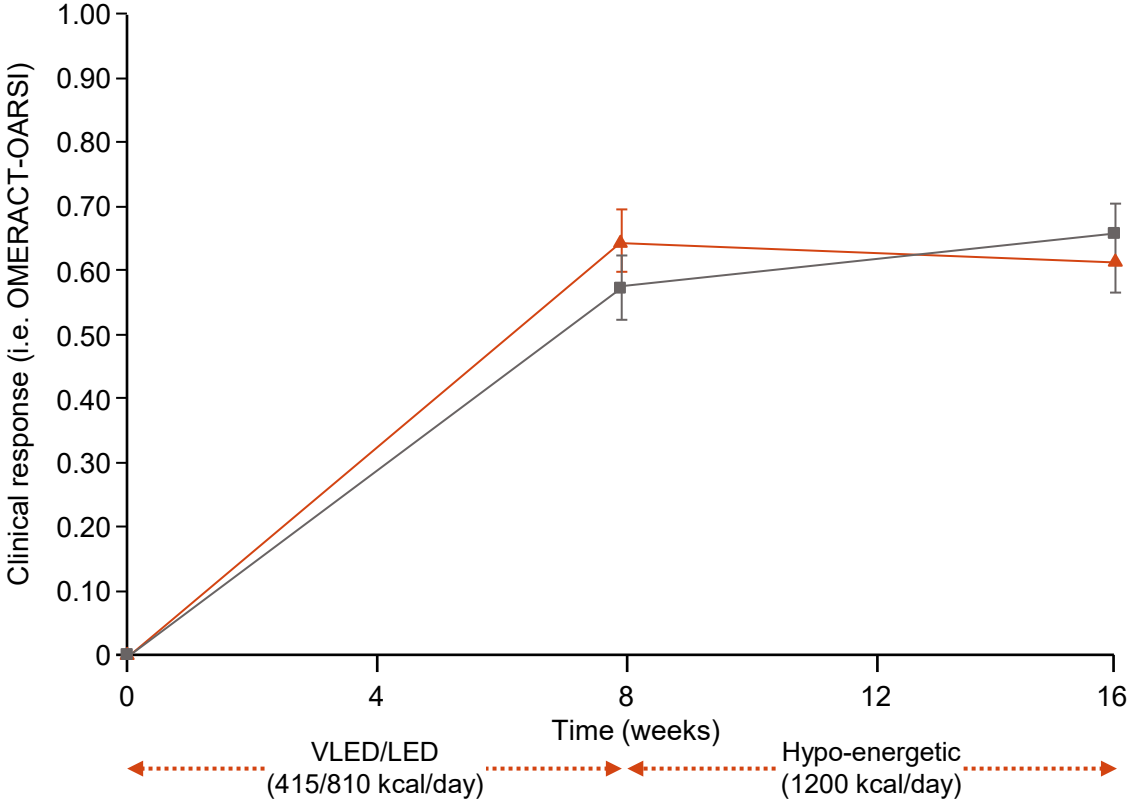
Weight loss during diet intervention for knee OA (K-L 1-4)



Baseline observation carried forward (Mean +/- SE).

Riecke *et al*. *Osteoarthritis Cartilage* 2010;18:746–54

Weight loss of 10% results in 28% improvement in OA



2 out of 3 gain OMERACT-OARSI response

Riecke *et al*. *Osteoarthritis Cartilage* 2010;18:746–54

Weight loss is effective for symptomatic relief in subjects with obesity and knee OA – regardless of radiographic grade

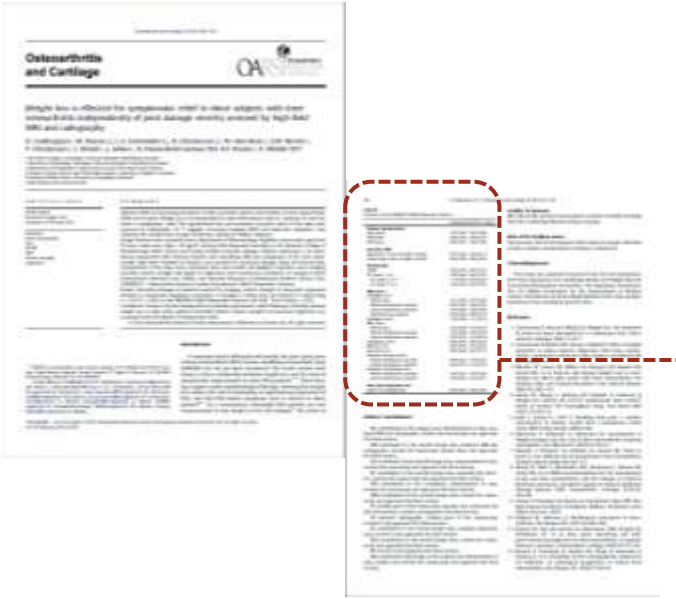
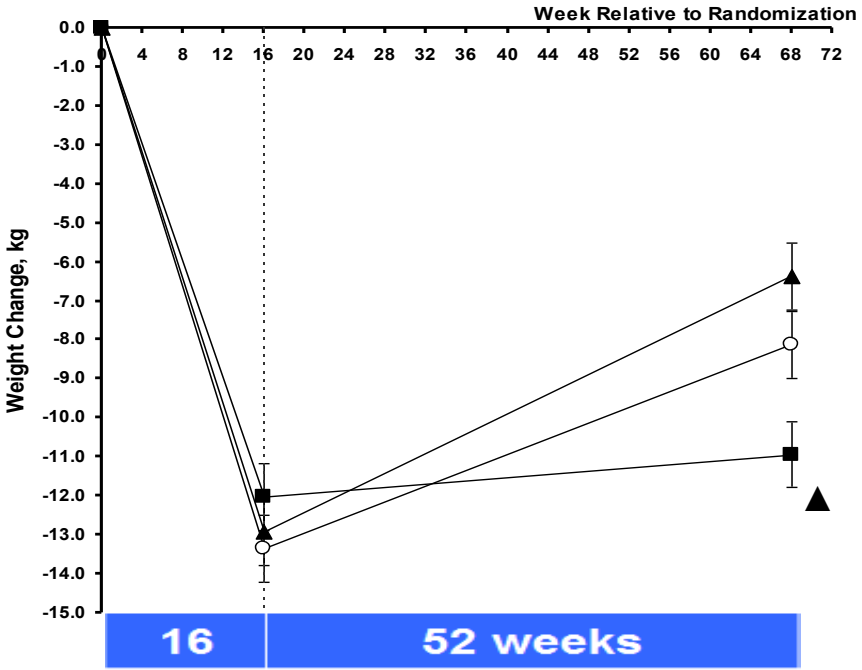


Table III
Predictors of the OMERACT-OARSI Responder Criterion

	Univariate OR [CI] (*P*-value)
Patient characteristics	
Age (years)	1.00 [0.96; 1.05] (0.88)
KOOS ADL	0.98 [0.97; 1.00] (0.07)
KOOS pain	0.99 [0.97; 1.00] (0.28)
Isometric MVC	
Quadriceps muscle strength (nm/kg)	0.55 [0.26; 1.20] (0.13)
Hamstrings muscle strength (nm/kg)	0.48 [0.08; 3.08] (0.44)
Radiographs	
mJSW	0.90 [0.75; 1.07] (0.22)
KL; grade 1 vs 4	1.68 [0.48; 5.85] (0.53)
KL; grade 2 vs 4	1.14 [0.50; 2.62] (0.62)
KL; grade 3 vs 4	1.46 [0.63; 3.43] (0.63)
MRI scores	
Cartilage score I	
Whole knee	1.01 [0.99; 1.03] (0.30)
Medial tibiofemoral chamber	0.99 [0.95; 1.04] (0.68)
Lateral tibiofemoral chamber	1.07 [0.90; 1.26] (0.46)
Patellofemoral chamber	0.98 [0.89; 1.08] (0.70)

Gudbergsen.*et al. Osteoarthritis Cartilage* 2012;20:495–502

Baseline average weight in 16 weeks = 103.2kg (n=192)
VLCD group lost 13.3kg (13%) at 16 weeks
LCD group lost 12.2kg (12%) at 16 weeks



Knee-Exercise - 6.3kg

Control - 8.3kg

Diet -11.0kg

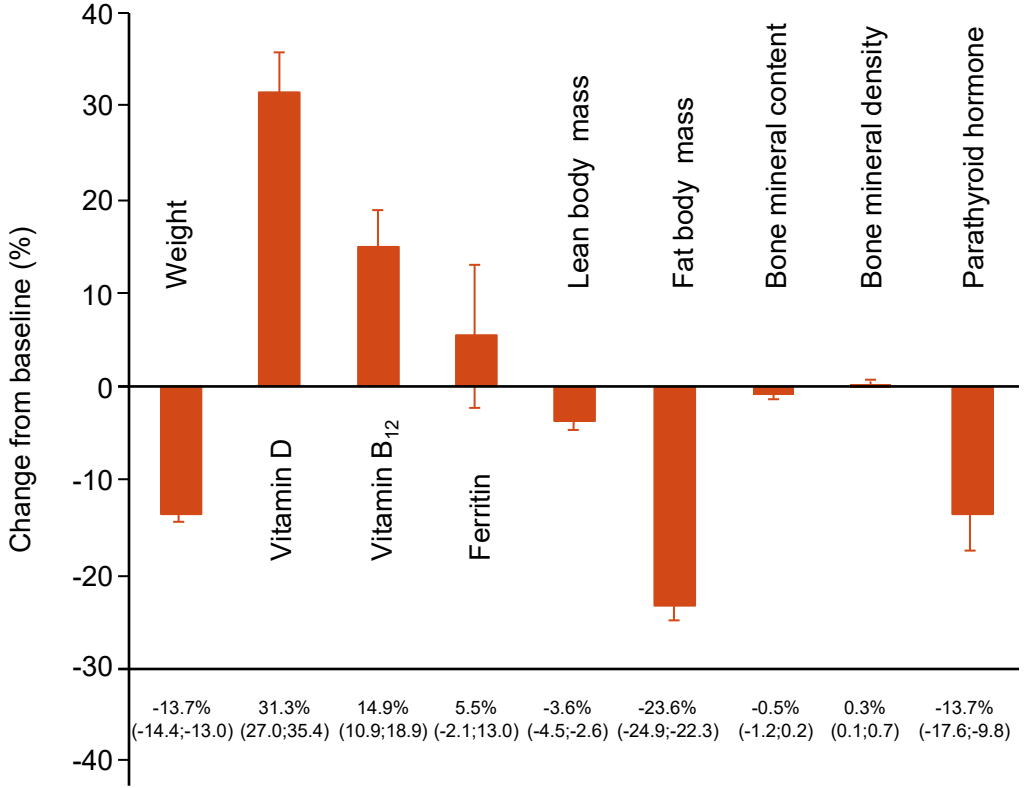
All groups had statistically significant pain reduction

Drop-outs:
Diet: 1/56
Control: 9/61
Exercise: 6/58

Excellent compliance

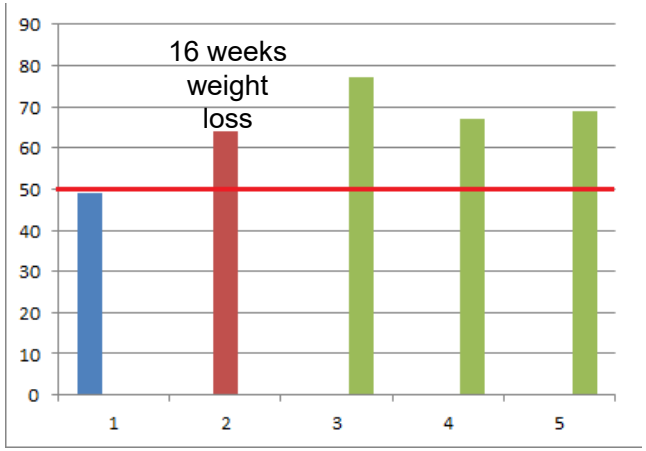
Christensen R., et al Arthritis Care & Research
Vol. 67, No. 5, May 2015, pp 640–650
DOI 10.1002/acr.22504

Weight loss is primarily due to loss in fat mass

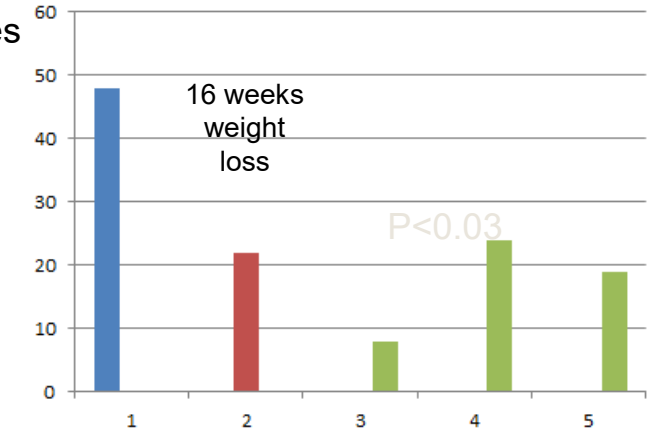


Christensen *et al. Eur J Clin Nutr* 2012;66:504–9

Vitamin D3 nmol/l



% cases D3 < 50 nmol/l



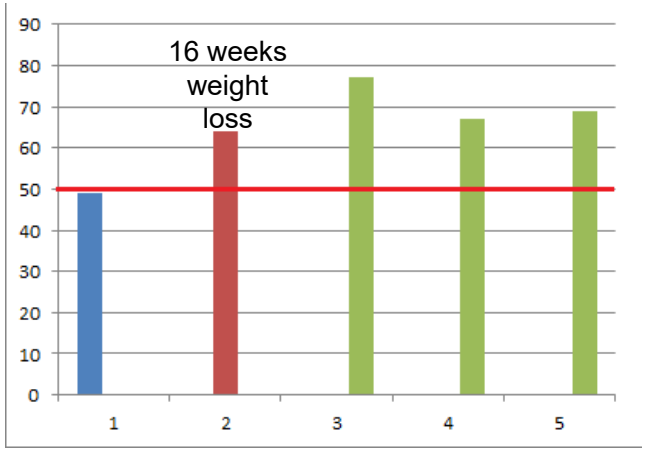
Time weeks	0	16	D68	E68	C68
Number n	192	192	64	64	64

Weight loss with formula diet plus dietary education reduced the number with low D3 from **48% to 22%** and

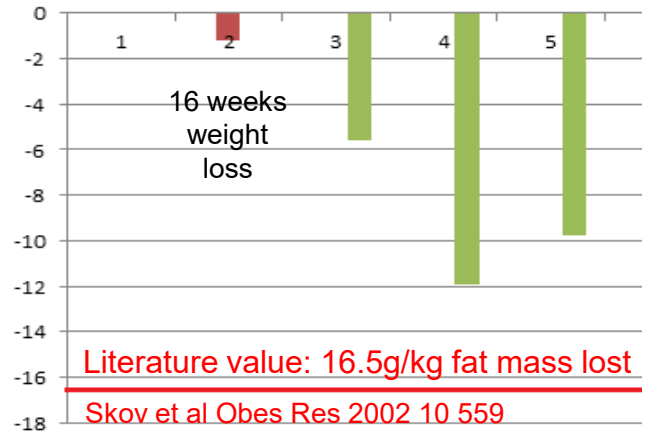
Weight maintenance with formula diet plus dietary education further reduced low D3 from **22% to 8%** of cases

Comparison of Three Different Weight Maintenance Programs on Cardiovascular Risk, Bone, and Vitamins in Sedentary Older Adults
Christensen et al Obesity
DOI: 10.1002/oby.20413

Vitamin D3 nmol/l



Change of bone mineral g per kg fat mass lost



Time weeks	0	16	D68	E68	C68
Number	192	192	64	64	64

Bone mineral loss per kg fat mass lost was lowest in the diet maintenance group in which the vit D3 level was highest and parathyroid hormone levels lowest …… dietary maintenance with with 1 MRP preserves bone mineral

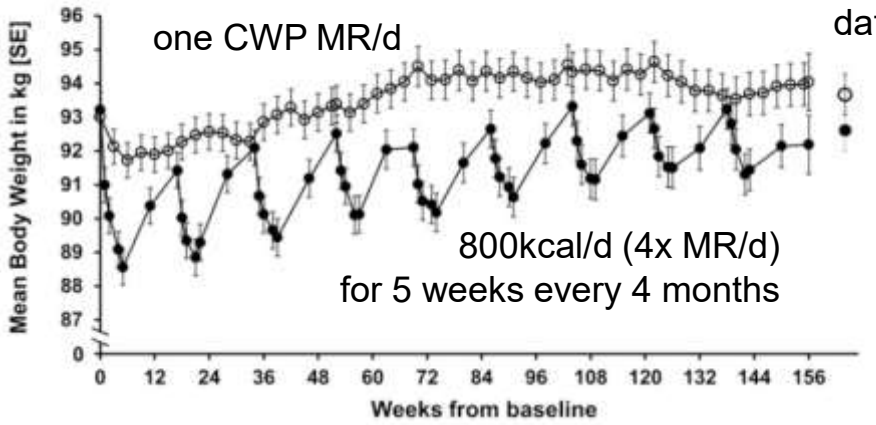
Comparison of Three Different Weight Maintenance Programs on Cardiovascular Risk, Bone, and Vitamins in Sedentary Older Adults Christensen et al Obesity
DOI: 10.1002/oby.20413

153 subjects randomised to: one CWP MR/d or 800kcal/d (4x MR/d) for 5 weeks every 4 months
Total MR consumption in the two groups was equal

4 year weight maintenance ~10% in 106/153

Dietitians' office data

CRU data



TKA surgery rates were not different:

Intermittent: 8/76

One MR daily: 12/77

Dietitian's office data = data on available cases
CRU = Clinical Research Unit (intention to treat data)

Long-term weight-loss maintenance in obese patients with knee osteoarthritis: a randomized trial
Christensen p et al 2017 Am J Clin Nutr

Conclusion

- Osteoarthritis of the knee is clearly associated with BMI and Age
- Weight loss reduces risk of knee osteoarthritis
- Weight loss ~10 % is shown to reduce symptoms (pain and physical function) regardless of radiographic status
- Weight loss can be obtained by TDR with parallel increase in dietary health

Thank you