THE IMPORTANCE OF ANIMAL-SOURCE FOODS IN WESTERN DIETS

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PROBLEMS IN THE YOUNG
Micronutrient status of UK children and adult females

%<LRNI

- Fe
- Ca
- Mg
- Zn
- Se
- I

Males 11-18y
Females 11-18y
Females 19-64y
Males 11-18y

LIMITLESS POTENTIAL | LIMITLESS OPPORTUNITIES | LIMITLESS IMPACT
Bone mass changes with age

Weaver et al. (2016)
Calcium intake in UK females

NDNS 2014, Y1-4 combined

Intake vs. Age range (years)

Ca g/d
1-3 4-6 7-10 11-14 15-18 19-64

RNI

University of Reading
Bonetrophic nutrient interactions
Protein for bones?

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fat</td>
<td>1.1g</td>
</tr>
<tr>
<td>of which saturates</td>
<td>0.1g</td>
</tr>
<tr>
<td>Carbohydrate</td>
<td>1.3g</td>
</tr>
<tr>
<td>of which sugars</td>
<td>0.1g</td>
</tr>
<tr>
<td>Fibre</td>
<td>0.4g</td>
</tr>
<tr>
<td>Protein</td>
<td>0.4g</td>
</tr>
<tr>
<td></td>
<td>0.1g</td>
</tr>
</tbody>
</table>
Dairy food intake in UK females

NDNS 2014, Y1-4 combined
Childhood milk intake and fracture risk in females $\geq$ 50 years

Relative risk of osteoporotic fractures

$P_{\text{trend}} = 0.04$

Servings milk in childhood

Kalkwarf et al., 2003
The National Osteoporosis Foundation’s position statement on peak bone mass development and lifestyle factors: a systematic review and implementation recommendations

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Abstract Lifestyle choices influence 20–40% of adult peak bone mass. Therefore, optimization of lifestyle factors known to influence peak bone mass and strength is an important strategy aimed at reducing risk of osteoporosis or low bone mass later in life. The National Osteoporosis Foundation has issued this scientific statement to provide evidence-based guidance and a national implementation strategy for the purpose of helping individuals achieve maximal peak bone mass early in life. In this scientific statement, we (1) report the results of an evidence-based review of the literature since 2000 on factors that influence achieving the full genetic potential for skeletal mass; (2) recommend lifestyle choices that promote maximal bone health throughout the lifespan; (3) outline a research agenda to address current gaps; and (4) identify implementation strategies. We conducted a systematic review of the role of individual nutrients, food patterns, special and physical activity, and the role of the social environment on bone health. The evidence is given in Tables 1–11, where the quality of evidence is graded as A, B, or C based on a modified version of the Oxford Centre for Evidence-Based Medicine grading system. Considering the evidence-based literature review, we recommend lifestyle choices that promote maximal bone health from childhood through young to late adolescence and outline a research agenda to address current gaps in knowledge. The best evidence (grade A) is available for positive effects of calcium intake and physical activity, especially during the late childhood and peripubertal years—a critical period for bone accretion. Good evidence is also available for a role of vitamin D and dairy consumption and a detriment of DMPA injec-
Sub-optimal vitamin D status across Europe
Recent studies of UK iodine status

Recent UK studies have shown sub-optimal status in:

- Women of childbearing age$^{1-3}$
- Pregnant women$^{4-7}$

Milk intake and 24 h iodine excretion

Bath et al. (2013)
Type of UK retail winter milk and iodine content

2 Supermarkets, Jan 2014

Payling et al. (2015)

Conventional vs. organic (P<0.001)
Conventional vs. UHT (P<0.05)
% UK population below serum ferritin threshold (12/15µg/L)

Bates et al. (2014)
UK household red meat purchases 1974-2010

DEFRA, 2013

Beef & veal

Sheep meat

DEFRA, 2013
Sucrose-sweetened beverages increase fat storage in liver, muscle and visceral fat.
MIDDLE AND OLDER AGE
### Recent meta-analyses of dairy and cardiometabolic diseases

<table>
<thead>
<tr>
<th>Dairy</th>
<th>Outcome</th>
<th>RR (95% CI)</th>
<th>Ref</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milk</td>
<td>AC mortality</td>
<td>1.00 (0.93-1.07)</td>
<td>Guo et al. in press</td>
</tr>
<tr>
<td>Milk</td>
<td>CVD</td>
<td>1.01 (0.93-1.10)</td>
<td>Guo et al. in press</td>
</tr>
<tr>
<td>Cheese</td>
<td>CVD</td>
<td>0.98 (0.95-1.00)</td>
<td>Guo et al. in press</td>
</tr>
<tr>
<td>Milk</td>
<td>Stroke</td>
<td>0.93 (0.88-0.98)</td>
<td>De Goede et al., 2016</td>
</tr>
<tr>
<td>Cheese/40 g/d</td>
<td>Stroke</td>
<td>0.97 (0.94-1.01)</td>
<td>De Goede et al., 2016</td>
</tr>
<tr>
<td>Yoghurt/80g/d</td>
<td>Diabetes</td>
<td>0.86 (0.83-0.90)</td>
<td>Gijsbers et al., 2016</td>
</tr>
</tbody>
</table>
Peripheral SBP & DBP

Overall treatment effect for C_SBP \( p=0.010 \),
Overall treatment effect for C_DP \( p=0.094 \),
Overall treatment effect for C_MeanP \( p=0.024 \)

\( n=38 \), Means ± SEM

Central SBP & DBP

Overall treatment effect for P_SBP \( p=0.007 \),
Overall treatment effect for P_DP \( p=0.095 \),
Overall treatment effect for P_MeanP \( p=0.009 \)

\( n=38 \), Means ± SEM

Fekete et al., AJCN (2016)
Changes in total and LDL-chol after consumption of ~80 g/d fat (~36g/d SFA) as cheese or butter

Cheese vs butter

Replacing saturated fat in milk fat

Ca soap (CS) of oleic acid study

Kliem et al., JDS 2013

![Graph showing g/100g DM for SFA and cis-MUFA with bars for Control, CS2, CS4, and CS6]
A few conclusions...

• Milk/dairy foods are key sources of important nutrients
• Red meat is a good source of Fe and Zn…..
• Composition can be influenced by primary production
• Declines in consumption esp. young females have already had consequences…..
• Functionality of some dairy foods beyond nutrient supply
• Risk of poor bone development especially in girls is concerning and may become a major issue
• Negative association of milk proteins and milk/fermented dairy and BP and T2DM may become the most important findings. Needs development.
• If food sustainability is driven by replacing animal with plant derived foods be careful what you wish for so…..
• Dietary pattern, nutrition and health must be included in any debate about sustainable food production
THANK YOU