case reports
THE CARE GUIDELINES

CASE REPORT

To encourage other practitioners to consider submitting a case report for the E-News, we have restructured the format in line with recommendations from July 2014 and have left in the key guides – should you be interested just email info@nutri-link.co.uk We will send you the word doc.

Case reports are professional narratives that outline the diagnosis, treatment, and outcomes of the medical problems of one or more patients. Information from case reports can be shared for medical, scientific, or educational purposes. They provide a framework for early signals of effectiveness adverse events, and cost. Case reports and the systematically collected data from which they are written also provide feedback on clinical practice guidelines.

Case Report of a 59 year old lady's bone density markers improve with targeted Nutritional Therapy, and her poor memory improves.

Abstract. *Summarise the following information if relevant: (1) Rationale for this case report, (2) Presenting concerns (eg, chief complaints or symptoms, diagnoses), (3) Interventions (eg, diagnostic, preventive, prognostic, therapeutic exchange), (3) Outcomes, and (4) Main lesson(s) from this case report.*

This case explores a nutritional focused approach to support the bone health, and ultimately bone strength and density, in a 59 year old woman, with a history of hysterectomy (partial) 20 years ago. Mrs K.M. also experienced memory loss and some digestive symptoms which were also points of focus for the nutritional therapy.

Osteoporosis

Osteoporosis literally means 'porous bones' and is often referred to as the fragile bone disease. Osteoporosis is a condition in which bones lose their strength and are more likely to break, usually following a minor bump or fall. Fractures that occur because of reduced bone strength are described as 'fragility fractures' and many of these will be caused by osteoporosis.

One in two women and one in five men over the age of 50 experience fractures[1], mostly as a result of low bone strength. Although fragility fractures caused by osteoporosis can happen in various parts of the body, the wrists, hips and spine are the most commonly affected sites.

Osteoporosis is also a term used to describe low bone density as measured on a bone density (DXA) scan. This means your bones may have lost strength.

Women are more susceptible

Women are more susceptible to osteoporosis because bone loss becomes more rapid for several years after the menopause, when sex hormone levels decrease. In addition, women tend to have smaller bones than men and in general live longer, with loss of bone tissue continuing for longer, making fragility fractures more likely.

Osteoporosis can start at 35 years of age

[1] https://nos.org.uk/about-osteoporosis/what-is-osteoporosis/

After the age of about 35 years, the difference between the amount of bone that is removed and the amount of bone that is laid down starts to get slightly out of balance as part of the aging process. As a result, the total amount of bone tissue starts to decrease. This is often described as 'bone loss' or 'bone thinning'. It doesn't mean your bones look any different from the outside. However, inside, the cortical 'shell' thins and the struts that make up the inner structure become thinner and sometimes break down. This results in the holes in the honeycomb structure becoming larger. This change in the quality of your bones is much more likely and more significant as you move into later life, which explains why bones become more fragile and fractures become more common in old age.

Prevalence in the UK
It is estimated that around 3 million people in the UK have osteoporosis.[2]

Medical Treatment
Drug treatments for osteoporosis help to strengthen your bones and reduce your risk of having fractures. They are not given to help with the pain that can occur when bones break.

Most drug treatments for osteoporosis work by slowing down the activity of the cells that break down old bone (osteoclasts). These are known as 'anti-resorptive' drugs. Some treatments stimulate the cells that build new bone (osteoblasts). These are known as 'anabolic' drugs. Others have less well understood ways of working that might combine both of these. The main aim of these drug treatments is to decrease the risk of breaking bones, and drugs are licensed on the basis that they do this. Often treatments will show an increase in bone density as well.

Nutritional support
There are many important nutrients for bone health including calcium, magnesium, vitamin D, K, boron, zinc, Vitamin C, collagen and more besides.

Exercise
The importance of exercise for bone health is well documented, including in women with osteopenia.[3]

Cognitive Decline & Memory Loss
Mrs K.M.'s memory for certain things has worsened, which has alerted her to be concerned for her cognitive function. According to the Alzheimer's Association there are 10 common signs of the development of the condition. These are 1) memory loss that disrupts daily life, 2) Challenges in planning or solving problems, 3) Difficulty completing familiar tasks at home, at work or at leisure, 4) Confusion with time or place, 5) Trouble understanding visual images and spatial relationships, 6) New problems with words in speaking or writing, 7) Misplacing things and losing the ability to retrace steps, 8) Decreased or poor judgement, 9) Withdrawal from work or social activities, 10) Changes in mood and personality. Based on a symptom analysis, Mrs K.M. has part of 1) and part of 4) and part of 7).

Given the new understanding of how certain biochemical interventions including many nutritional factors can be involved in supporting brain health[4], the sooner one identifies a need for support the sooner that appropriate changes can be identified and implemented.

[2] https://nos.org.uk/information/osteoporosis-treatment-options/
[3] Korpelainen et al. Long-term outcomes of exercise: follow-up of a randomized trial in older women with osteopenia. Arch Intern Med. 2010 Sep 27;170(17):1548-56. doi: 10.1001/archinternmed.2010.311. http://tinyurl.com/m7twgba
[4] See article: "36 'Holes in the Roof' The Dawn of the Era of Treatable and Preventable Alzheimer's Disease" - http://tinyurl.com/y79jo45r

However, on the subject of dementia, in 2014, in the UK, The Alzheimer's Society estimated that there are 850,000 people with dementia, and of these 40,000 are of a younger age (i.e. younger than 65). There further estimate there will be 1 million people with dementia in the UK by 2025. One in six people aged > 80 have dementia. Two thirds of people with dementia are women. The proportion of people with dementia doubles for every five-year age group. The financial cost of dementia to the UK is £26 billion per annum (similar to diabetes). 60,000 deaths a year are directly attributable to dementia. Only 44% of people with dementia in England, Wales and Northern Ireland receive a diagnosis. This is most definitely a serious threat to well-being, the family, and society.

Key Words. *Provide 3 to 8 key words that will help potential readers search for and find this case report.*
Osteoporosis, osteopenia, memory loss, digestive, inflammation, vitamins D & K, exercise, BDNF.

Introduction. *Briefly summarise the background and context of this case report.*
Mrs K.M. presented with a worsening memory, intermittent stomach rumblings and abdominal bloating and medically diagnosed osteoporosis. Mrs K.M had never broken a bone, but was conscious of not consuming many dairy products what with their calcium content.

She had a tendency to anaemia, which could be entirely due to the thalassemic trait B she carried. She is also hypermobile.

Mrs K.M. had been treated for breast cancer in 2010, had undergone a local excision followed by 8 weeks of radiotherapy and tamoxifen. After 9 months, she had switched to the aromatase inhibitor Anastrazole, which effectively reduces the amount of oestrogen in the body. She needed to stop this medication, however, due to the side effects of fatigue, depression and feeling spaced out.

Mrs K.M. had engaged in exercise of one kind or another for most of her life and enjoyed swimming, working out in the gym, walking, dancing when the occasion arose, and even jumping on the spot.

What concerned Mrs K.M. more than anything else right now was her bone and memory loss, which appeared to have occurred within the same time frame of the past 5 or so years. She also wanted her digestive sensitivity to be resolved.

Her daughter is a nutritional therapist and had recommended her mother to take vitamin D and K2 and magnesium which she was duly doing. However, as is probably helpful in most family situations, both she and her daughter wanted another professional view on what she could be doing to optimise her health in these areas.

Presenting Concerns. *Describe the patient characteristics (eg, relevant demographics—age, gender, ethnicity, occupation) and their presenting concern(s) with relevant details of related past interventions.*

Mrs K.M. is a British woman of Italian heritage, and she speaks Italian.

She was 59 when we met, and was retired from her work. She lives north of London. She had two children, a daughter and a son, now in their early 30's.

Due to the digestive symptoms they caused, Mrs K.M. had not eaten many dairy products, especially milk, for many years and had switched to soy products instead.

Although she had been through minor surgery and then radiotherapy and chemotherapy for breast cancer in 2011, this was not the pressing issue in her health. Rather, the more recently diagnosed osteoporosis and memory loss as well as ongoing tummy rumblings were her priority concerns.

She told me of a "horrendous experience" that she had had recently, which was when she could not recall what her hallway looked like, which was a shock to her. In spite of being tested in a memory clinic in 2011 and been told that she had passed those tests, she was still concerned, and in her own opinion it had become worse over the past 5 years.

Mrs. K.M. was eating what she felt was a good diet and had added the bone-supportive nutrients of vitamin D & K, and the minerals calcium and magnesium. Her bone density was normal in 2009. This suggested that the early hysterectomy at 38, in 1995 was not the sole driver of the bone loss.

Clinical Findings. *Describe: (1) the medical, family, and psychosocial history including lifestyle and genetic information; (2) pertinent co-morbidities and relevant interventions (eg, self-care, other therapies); and (3) the physical examination (PE) focused on the pertinent findings including results from testing.*

Mrs K.M.'s parents had been relatively well and had lived to their mid 80s. There was no family history of osteoporosis, no evident dementia or reduced cognitive functioning and no recollected digestive issues in either her mother or father.

There was no singular condition which followed the family tree, except for the thalassemic trait, known as beta thalassemia. Beta thalassemias are due to mutations in the HBB gene on chromosome 11, also inherited in an autosomal, recessive fashion. The severity of the disease depends on the nature of the mutation and on the presence of mutations in one or both alleles. The presence of this reflects the known Mediterranean ancestry.

When we met, there was no issue about the breast cancer which has been treated in 2010. However, although it is an invisible condition in most ways, the loss of bone concerned Mrs K.M. because she had always exercised and kept fit and eaten what she felt had been a sound diet.

She was also most concerned about memory loss, which is something that ranks most highly in post-menopausal women's health concerns: the loss of cognitive function.

In addition, she wanted to resolve the digestive symptoms she had. If she drank a coffee she would go straight to the loo. If she ate chocolate, the same thing would happen and be accompanied by wind. If she ate nuts then she would have a gripey stomach. If she took the skins off the peanuts then this would reduce the discomfort. If she had eaten a food to which she reacted at dinner, then her tummy could still be bubbling away at 2 a.m. Her lower abdomen was tender to the touch if pressed.

Mrs K.M. showed me blood tests taken over the past number of years, with the earliest dated 2011. Back then, her ferritin has been completely normal at 101 ug/L (12-250 ug/L). However, this dropped to 59 ug/L by February 2013.

In 2012, the TSH was 3.56 mu/L (0.35 – 5 mu/L) but this is higher than a more ideal level of 1.0 mu/L, and at the same time her Free T4 level was 9.6 pmol/L (7 – 20 pmol/L) which is borderline low, and helps to explain the higher-than-ideal level of TSH.

In February 2013, the haematology results clearly identified beta thalassemic trait, with haemoglobin, haematocrit, mean cell volume (MCV), mean corpuscular haemoglobin (MCH) and red cell distribution width all showing an anaemic status. At this time, the bilirubin level was marginally elevated at 23 umol/L (3 – 20 umol/L).

These results are summarised here:

Blood tested analyte & date	Result & reference range
Ferritin (April 2011)	101 ug/L (12 – 250 ug/L)
Ferritin (February 2013)	59 ug/L (12 – 250 ug/L)
Ferritin (June 2016)	93 ug/L (12 – 250 ug/L)
TSH (January 2012)	3.56 mu/L (0.35 – 5 mu/L)
Free T4 (January 2012)	9.6 pmol/L (7 – 20 pmol/L)
Haemoglobin (February 2013)	**109 g/L** (120 – 160 g/L) **(LOW)**
Haemoglobin (June 2016)	**105 g/L** (120 – 160 g/L) **(LOW)**
Haematocrit (February 2013)	**0.34 L/L** (0.35 – 0.45 L/L) **(LOW)**
Mean Corpuscular Haemoglobin – MCH (February 2013)	**22.4 pg** (27 – 32 pg) **(LOW)**
Mean Corpuscular Volume – MCV (February 2013)	**69.7 fl** (80 – 100 fl) **(LOW)**
Red Cell Distribution Width - RDW (February 2013)	**15.6** (11 – 14.5) **(HIGH)**
Serum B12 (June 2016)	361 ng/L (130-800 ng/L)
Serum Folate (June 2016)	12.6 ug/L (4 – 20 ug/L)
ESR (June 2016)	11 mm/hr (2 – 12 mm/hr)
CRP (C-Reactive protein) (June 2016)	1 mg/L (0 – 7 mg/L)
Serum bilirubin level (June 2016)	23 umol/L (3 – 20 umol/L)

On a review of her diet, it was identified that Mrs K.M. did eat well, overall; mostly whole fresh food, vegetables, fruits, nuts, olives, variety of animal proteins, green tea. There were some specifics that were identified for change and this included the inclusion of a protein with breakfast and the exclusion of wheat bran at breakfast due to its potential for inhibiting the absorption of minerals, including calcium.

Mrs K.M.'s health goals were these:

To optimise bone density	To optimise muscle strength
To improve memory	To be free of digestive rumblings
To improve tolerance to foods	To prevent cancer recurrence

Timeline. *Create a timeline that includes specific dates and times (table, figure, or graphic).*
Historically, Mr K.M. had been fundamentally well. She was born with thalassemia B trait, and she had had the usual childhood illnesses. She had her tonsils removed before puberty, and she had suffered from ear infections as a child.

There had been certain conditions that had troubled her in her adult life. She had experienced labyrinthitis for a short time in her life, and similarly with blepharitis. She had lower back problems, and had been diagnosed with scoliosis, and this influenced the types of exercise that could be engaged in.

For quite some years, Mrs K.M. had noticed that whenever she drank coffee that she had irregular bowel movements; she was prompted to go right away.

Mrs K.M. observed that certain foods elicited stomach rumblings and this included nuts, chocolate and excess diary which she had limited now for some years. In the place of some dairy products specifically milks, she had consumed soy products.

In 1995, aged 38, Mrs K.M. had a hysterectomy. The ovaries were not taken out. She was put on HRT but chose to come off it after 18 months.

In 1997, aged 40, Mrs K.M. had a haemorrhoidectomy.

(n 2009, aged 52, Mrs K.M. had her bones tested and the results were normal, and she was aware of the importance of vitamin D and sunlight.

In 2010, aged 53, Mrs K.M. was diagnosed with breast cancer and had a lumpectomy with sentinel lymph node biopsy. She underwent the 8 weeks of radiotherapy and took Tamoxifen for 9 months. She then took the aromatase inhibitor Anastrazole but needed to stop this due to the tiredness, low mood and the feeling of being spaced out.

In 2011, Mrs K.M. attended a clinic for assessment for her memory. There was no strong evidence in the testing that there was an issue, but Mrs K.M. remained concerned, and she experienced instances where her memory failed her.

In 2016 Mrs K.M. had a Bone Mineral Density (BMD) test, the results of which are shown here:

	BMD	T Score	z score	Diagnosis
AP spine	0.817	-2.1	-0.8	Osteopenia
Femoral neck	0.531	-2.9	-1.6	Osteoporosis
Hip left	0.722	-1.8	-0.9	Osteopenia

She was prescribed Risedronate nut was forced to stop it due to side effects. Risedronate sodium is a pyridinyl bisphosphonate that binds to bone hydroxyapatite and inhibits osteoclast-mediated bone resorption. Other bisphosphonate drugs include Alendronate (Fosamax), Ibandronate, Zoledronate.

Diagnostic Focus and Assessment. *Provide an assessment of the (1) diagnostic methods (eg, PE, laboratory testing, imaging, questionnaires, referral); (2) diagnostic challenges (eg, financial, patient availability, cultural); (3) diagnostic reasoning including other diagnoses considered, and (4) prognostic characteristics (eg, staging) where applicable*.

A urinary test to assess for bone resorption was recommended, as was a vitamin D blood spot test. The results of these are shown below.

First bone resorption assessment urine test, October 2016

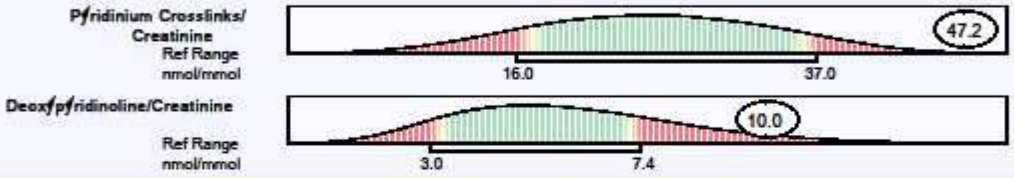
Bone Resorption Assessment (Urine)

GENOVA DIAGNOSTICS EUROPE

Parkgate House
356 West Barnes Lane
New Malden, Surrey KT3 6NB

63 Zillicoa Street
Asheville, NC 28801 USA

Chemistry Parameters



Commentary

Methodology: EIA and Kinetic (Jaffe)

Commentary is provided to the practitioner for educational purposes, and should not be interpreted as diagnostic or treatment recommendations. Diagnosis and treatment decisions are the responsibility of the practitioner.

Pyridinium crosslinks consist of both pyridinoline and deoxypyridinoline. Deoxypyridinoline is found predominantly in bone tissue, whereas pyridinoline is found in both bone and cartilage. Pyridinium crosslinks are released when bone is broken down (or resorbed). While not diagnostic of osteoporosis, these markers may be used to monitor bone resorption status and therefore are a useful gauge of treatment efficacy.

The level of pyridinium crosslinks is elevated. Abnormally high pyridinium crosslinks in urine suggest increased cartilage, connective tissue, and/or bone resorption. For example, pyridinoline might be elevated secondary to rheumatoid arthritis, lupus and other connective tissue disorders, osteoarthritis, or chronic alcohol ingestion. Similarly, periods of rapid growth or repair of connective issue (adolescence post-trauma) may lead to high levels.

Significantly elevated levels of pyridinium crosslinks have been noted in conditions such as hyperthyroidism, hyperparathyroidism, Paget's disease, multiple myeloma, hypercalcemia of malignancy, and certain cancers, particularly if associated with bone metastases. Elevations have also been seen with liver dysfunction, renal osteodystrophy, spinal cord injury, bone marrow transplantation, gastrointestinal diseases related to nutrition and mineral metabolism, cystic fibrosis, scleroderma, growth hormone disorders, growth hormone treatment, and estrogen deficiency.

The level of deoxypyridinoline (DPD) is elevated, indicating an increased rate of bone loss. In individuals with no underlying bone disease, this is an important marker in the development of osteoporosis. Elevations of DPD may also suggest a recent fracture (levels may stay elevated for up to a year), or a rapid state of bone development as is found in adolescence. DPD is naturally elevated in pregnancy and the post-partum period, with levels gradually

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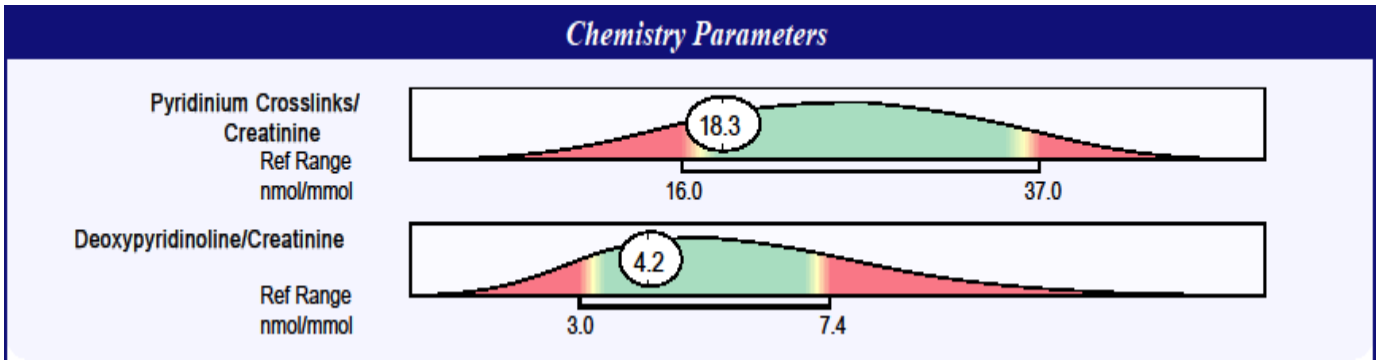
The second bone resorption assessment urine test was conducted in March 2017. The marked improvements in the second test reflect the changes made in Mrs K.M.'s nutrition and exercise, which are described in the next section of this case report.



Over a year before meeting with me, Mrs K.M. had done a blood spot vitamin D test which showed too low a level. She had been taking vitamin D since that time, so I recommended a repeat test to identify where her level had risen to now. Both results were below the range but the second result had shown improvement.

Vitamin D Blood Spot Tests	reference interval 100-200 nmol/L
Test one **25-hydroxyvitamin D total** (8.5.15)	58 nmol/L **(LOW)**
Test two **25-hydroxyvitamin D total** (21.11.16)	83 nmol/L **(LOW)**

Therefore, as part of the focus on helping Mrs K.M. support her bone health in the best way, vitamin D was still included but at a higher dose.

There were no tests available to measure in any way Mrs K.M.'s memory or cognitive performance. However, her subjective observations of her own memory failing were grounds enough to be concerned.

Similarly, there were no tests to confirm any specific type of reaction to coffee or nuts or dairy products, but the observation of the immediate and predictable association with the coffee and these foods confirmed that they were triggers of such symptoms.

Therapeutic Focus and Assessment. *Describe: (1) the type(s) of intervention (eg, preventive, pharmacologic, surgical, lifestyle, self-care) and (2) the administration and intensity of the intervention (eg, dosage, strength, duration, frequency).*

It is straightforward to identify that Mrs K.M. had a need for more robust bone nutrition. This was in spite of having taken vitamins D & K already.

However, when we first met in September 2016, and whilst awaiting the test results of the urinary bone resorption test and the blood spot vitamin D test, I made specific recommendations for Mrs K.M. that were focused on liver and brain support. With a careful and thorough review of Mrs K.M.'s case history, it appeared

that the cancer therapy in 2010 was relevant in terms of the oxidative stress and potential cell damage that this could have contributed to her memory failing on occasion as well as her digestive symptoms, which could be attributable to lack of ideal bile production and or flow, amongst others.

As a result, I recommended a glutathione support supplement and a vitamin E-like antioxidant, called tocotrienols that have been shown to be both hepato- and CNS-protective. Even though the CRP and ESR were normal in June 2016, these do not show the wide array of inflammatory cytokines that could be present in spite of completely normal levels of these 2 analytes.

First Supplement Programme (Sept 2016)	
Thiodox (ARG)	1 with each meal
Tocomin SupraBio Tocotrienols (ARG)	1 with each meal
Phosphatidyl Choline (ARG)	2 with lunch, 3 with dinner
and as before	
Vitamin D 1,000 iu	Per day
Vitamin K menaquinone 45 mcg	Per day
Magnesium oxide 500 mg	Per day

As Mrs K.M. was travelling abroad, we only managed to speak some weeks later, with the bone resorption test results coming back in October 2016 and the blood spot vitamin D test coming back in November 2016.

When we did speak to discuss the results, Mrs K.M. reported that in that time she had felt improvements in her health and specifically in the areas of concern. Whilst the trigger foods still triggered the same gut symptoms, she reported that her memory was better with fewer moments of forgetting something, and she was less worried about that aspect of her health.

Her vitamin D levels were now 83 from 58 nmol/L and therefore I increased the dose of the vitamin D, and included an all-round bone nutrient formula to her.

I explained the urine test results which clearly showed too rapid a loss of bone proteins, reflecting an increased rate of bone loss vs bone remodeling.

Mrs K.M. told me was learning a new language and was finding it hard, in spite of already speaking two languages fluently. It is known, however, that engaging the brain in such an exercise as learning a new language is of utmost good for the development of neurons and maintaining brain cells.

Mrs K.M. had incorporated resistance exercise into her schedule, taking care of her lower back, and I emphasized the importance of muscle strength in overall health and specifically in bone health.

We agreed that Mrs K.M. would continue to follow the small number of dietary changes, continue to exercise and use her muscles, and take the expanded number of supplements, and after a period of time, repeat the urine bone resorption test. Again, because of travel, it meant that this would be a number of months away.

Second Supplement Programme (November 2017)	
Thiodox (ARG)	1 with each meal
Tocomin SupraBio Tocotrienols (ARG)	1 with each meal
Phosphatidyl Choline (ARG)	2 with lunch, 3 with dinner
and as before	

Vitamin D 2,000 iu	Per day
Vitamin K menaquinone 45 mcg + 65 mcg in Osteo-B-Plus	Per day
Magnesium oxide 500 mg	Per day

In February 2017, we had a further telephone appointment and Mrs K.M. confirmed ongoing improvements in her memory and overall physical strength and health. She had been following the changes in diet, taken the supplements and done the exercise.

The repeat urine test bone resorption test had been ordered and was to be undertaken in March 2017.

The results showed a marked improvement, with a significant reduction in the pyridinium and deoxypyridinoline cross links from 47.2 to 18.3 and 10.0 to 4.2 respectively. This is a soft marker for bone health and distinct from a direct bone mineral density test but acts as a dynamic marker to help determine whether a current intervention programme is being effective or not. We were both aware of the limited variables within her life and these were limited to the new supplements, avoidance of wheat bran and regular resistance exercise.

When there is more than one variable involved, it becomes increasingly difficult to make definitive judgements about cause and effect. However, it is my opinion that whilst the combined changes are no doubt the most positive, the improvements occurred not just due to the increase in vitamin D (which was still not in the normal range in November) but because of the anti-inflammatory role of the glutathione and tocotrienols and phosphatidyl choline, when used in combination with the synergy of bone nutrients in the multiple formula.

Third Supplement Programme (March 2017)	
Thiodox (ARG)	1 with each meal
Tocomin SupraBio Tocotrienols (ARG)	1 with each meal
Phosphatidyl Choline (ARG)	2 with lunch, 3 with dinner
Osteo-B-Plus (BRC)	1 with each meal
and as before	
Vitamin D 2,000 iu	Per day
Vitamin K menaquinone 45 mcg + 65 mcg in Osteo-B-Plus	Per day
Magnesium oxide 500 mg	Per day

We do not have a follow up bone mineral density test to confirm improvements in this test, but when I do receive that data in the coming months I will report back and we can all view the hard data and see if there is a straight-line connection with the metabolic indicator marker of the bone resorption results. At the same time, the environmental stimuli of the exercise to promote healthy growth factors for both muscle and bone are present each week, and need to be factored into the ultimate outcome in terms of bone density.

All of these improvements occurred in the absence of hormonal intervention, given the early hysterectomy when Mrs K.M. was 38 years old. There may have been more rapid and more significant improvements in bone density if an appropriate level of bio-identical oestradiol and progesterone had been administered by a doctor. However, with the recent history of a breast cancer, the use of hormones also raises inappropriate risks.

It is also known that exercise helps to stimulate Brain Derived Neurotropic Factor (BDNF) which supports brain healing.

In the meantime, Mrs K.M. continues to remain physically strong, and has experienced improvements in her memory (fewer blank moments).

This case represents an example of limited nutritional and lifestyle therapeutic intervention supporting historical events, such as the radiotherapy and chemotherapy, early surgical induced menopause, proving successful in terms of dynamic metabolic markers of bone health and subjective observation of well-being.

Supplement Information

Thiodox (ARG)
Supports a healthy liver detoxification, primarily phase II, provides antioxidant protection, supports a healthy immune function and production of glutathione, facilitates the production of cellular energy, enhances the effectiveness of other antioxidants. Provides NAC, glutathione, lipoic acid, selenium, riboflavin, thiamine & vitamin C.

Tocomin SupraBio Tocotrienols (ARG)
This product offers enhanced absorption of the 4 tocotrienols, which offer antioxidant support. They have been shown to have benefits in a number of different conditions from helping to prevent stroke to reducing a fatty liver, to lowering cholesterol and more. Do view this article (one of a number on the subject of tocotrienols) on our website: Tocotrienols and their Benefits.

Phosphatidyl Choline (ARG)
A fat emulsifier, providing overall cell membrane integrity support, and hepatoprotective.

Osteo-B-Plus (BRC)
This product supplies a wide array of essential and important nutrients to assist in the preservation of existing bone mineral mass and protein matrix and to support repair mechanisms. Magnesium, calcium, zinc, manganese, copper, boron, micro-emulsified vitamin D, vitamin K, B-Complex vitamins, vitamin C, purified chondroitin sulphate, SOD, and catalase.

Vitamin D & Vitamin K2
These two fat soluble nutrients are essential for bone health.

Discussion. *Please describe (1) the strengths and limitations of this case report including case management, (2) the literature relevant to this case report (the scientific and clinical context), (3) the rationale for your conclusions (eg, potential causal links and generalizability), and (4) the main findings of this case report: What are the take-away messages?*

Strengths and limitations of this case report including case management
The detail of the case history is always vital, and in this instance, there were a variety of laboratory tests to support a better understanding of what was going on within Mrs K.M.'s body. At the same time, the appreciation of the toll that radiotherapy and chemotherapy can take on the body and yet NOT disturb an array of blood test markers is important.

The literature relevant to this case report

There is literature which supports the function of nutrients that are vital for bone, as there is for resistance and other exercise being beneficial for osteopenic women. There is not much literature that discusses the longer term effects of radiotherapy and chemotherapy.

The rationale for your conclusions
The reasons why I made the recommendations in the sequence that I did was based on the case history information and then steered by the lab evidence. The vitamin D status and the bone resorption markers gave strong evidence for the need to help supply more key bone nutrients, as well as encourage appropriate stimulatory exercise and physical activity.

The main findings of this case report: What are the take-away messages?
Rather than see a person with a variety of conditions, such as history of breast cancer, and separately osteoporosis, and separately reducing memory and separately digestive symptoms the whole person needs to be seen as a whole.

In this case, the use of laboratory tests proved to be essential to steer the dosing of key nutrients that likely helped to achieve the improvements in the repeat bone resorption test.

Patient Perspective. The patient should share his or her experience or perspective of the care in a narrative that accompanies the case report whenever appropriate.

Mrs K.M. was naturally very pleased with the results of the second bone resorption test, and like me, we await the next DXA Bone Mineral Density Scan. It has given Mrs K.M. more confidence in life and she lives with much less worry now. Her active engagement in addressing her health issues has been a very positive experience.

Informed Consent. *Did the patient give the author of this case report informed consent? Provide if requested.*

The patient is aware that her case history is being written up in this format, although all identifiable data has been removed. K.M. are not her real initials.

Case Report Submission Requirements for Authors

1. Competing interests. *Are there any competing interests?*

None Known

2. Ethics Approval. *Did an ethics committee or Institutional Review Board give approval? If yes, please provide if requested.*

This case was not presented to an ethics committee.

3. De-Identification. *Has all patient related data been de-identified?*

All patient data has been re-identified

4. Author. *Name of Author and practice*

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