

Travel Grant Application Dr Isobelle Smith

Abstract:

Background: Relative Energy Deficiency in Sport (previously referred to as the Female Athlete Triad) is less defined and likely under recognised in Males due to the absence of amenorrhoea as a defining feature. Relative Energy Deficiency in Sports (REDS) causes multiple hormonal abnormalities and is associated with osteoporosis and other complications.

Clinical case: A 39-year-old male recreational runner (running 120kms/week) presented with multiple stress fractures including the left iliac crest, calcaneal, left and right fibular fracture and bone marrow oedema in right pubic body.

Fractures occurred within a four-year period and prior to this his only fracture history was a distal radius from a fall on an outstretched hand as a child.

Bone density scan revealed very low bone density with a lumbar spine Z-score of – 3.8, T-score – 3.9 and left femoral neck Z-score of – 2.1 and T-score – 2.6.

Past medical history included childhood dyspraxia and low sperm count and poor sperm quality diagnosed during fertility treatment. He denied a history of purposeful eating disorder. There was no family history of osteoporosis or recurrent fractures. His only regular medication was cod liver oil supplement but had commenced Calcium and vitamin D supplementation after the diagnosis of low bone density.

Clinical examination revealed a lean Caucasian male with no obvious syndromic features. He had a moderate chest pectus carinatum. Clothed weight was 64.0kg, height 182cm and BMI 19.3kg/m².

Initial review recommended referral to a sports dietitian and increase in caloric intake. Osteoporosis screen was completed after nutritional changes and commencement of calcium and vitamin D supplementation.

Pathology revealed negative coeliac serology, normal serum calcium 2.42mmol/L (2.10-2.60), normal PTH 2.2pmol/L (1.5- 9.9), and vitamin D was replete at 108nmol/L (51-200).

He was biochemical euthyroid with TSH 1.0mIU/L (0.5-4.0) and normal IGF-1 of 20nmol/L (13-36) and growth hormone < 1.0 mIU/L (< 3.1).

The 24-hour urine calcium was normal at 5.7pmol/24 hour (2.5-7.5), free cortisol normal at 272nmol/24 hour (<280) and 1-Methyl histamine 1.43umol/day (<1.90).

Testosterone was low-normal at 10.8nmol/L (8.3-29) with normal gonadotropins LH 3.1IU/L (<10) and FSH 9.0IU/L (<10). There was a low calculated free testosterone at 182.6pmol/L (255.0-725.0) with normal sex hormone binding globulin of 41nmol/L (11-71). Karyotype analysis was a normal male XY.

He was iron deficient with a ferritin of 14ug/L (30-300).

The patient was diagnosed with prolonged relative energy deficiency syndrome characterised by mild hypogonadism, iron deficiency and bone density in the lumbar spine 3.8 standard deviations below average for his age and sex.

Bone turnover markers were tested after increased caloric intake and decreased running volume. There was increased bone formation compared to resorption with a P1NP of 100ug/L (15-80), compared to a CTX of 464ng/L (100-600).

Due to ongoing P1NP elevation, pharmacotherapy was not initiated. Lifestyle management with increased caloric intake, weight gain and decrease in total physical activity was recommended.

Bone density will be repeated 12 months after nutritional changes were implemented. If bone density fails to increase or a traumatic fracture occurs, initial therapy with Romosozumab or Teriparatide will be considered.

Conclusion: This case is an example of significantly reduced bone density due to unintentional relative energy deficiency. Relative energy deficiency in endurance athletes is an important yet under recognised cause of osteoporosis in males and treatment is predominantly lifestyle related. This case demonstrates the importance of careful history taking and incorporating lifestyle measures in the management of osteoporosis.

Cover letter

I am writing to apply for the travel scholarship to support my attendance at the 2025 US Endocrine Conference in San Francisco, where I will be presenting a poster on a case of osteoporosis in a male athlete resulting from Relative Energy Deficiency in Sport (RED-S).

This case report highlights an important but often under-recognised condition in male athletes. Previously referred to as the "Female Athlete Triad," RED-S was renamed in 2014 to reflect its broader clinical relevance, including its occurrence in males, its multifactorial causes (which are not always due to intentional eating disorders), and its impact on multiple physiological systems beyond bone health. My case also underscores the importance of addressing the underlying nutritional deficiencies rather than prematurely initiating testosterone replacement or antiresorptive therapy.

I have a strong interest in athlete bone health and am actively exploring opportunities to pursue a fellowship in sports endocrinology in the United States. Attending this conference will allow me to engage with international experts, gain deeper insights into this evolving field, and build valuable connections with clinicians and researchers working in this niche area of endocrinology.

As I am currently working solely in private practice, I do not receive financial support or allocated leave for conference attendance. The travel scholarship would significantly offset the personal financial burden of attending and enable me to make the most of this professional development opportunity.

Thank you for considering my application. I am excited to contribute to and learn from the global endocrine community at this important event.

Sincerely,

Dr Isobelle Smith

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Dr Isobelle Katherine Smith

Professional summary: I graduated with a MBBS from the University of Tasmania in 2014 and completed Endocrinology training (FRACP) in Feb 2024. I am experienced in all areas of endocrinology including antenatal care. I have specific interests in metabolic health, bone health, thyroid dysfunction, and female fertility disorders.

I am the medical expert from a female running tech company “Femmi Co” and have also worked with Nike and other sporting organisations as an expert consultant on female athlete health.

Education and Awards

Fellow of the Royal Australian College of Physicians (Endocrinology)

February 2024

- FRACP written and clinical exams completed 2018

Bachelor of Medicine/Bachelor of Surgery - University of Tasmania

2010 - 2014

- Graduated with Clinical Distinction

2014

- Menzies Research Scholarship
- Kenneth Douglas McConnell Memorial Scholarship

2013

2013

Post Fellowship Medical Experience:

Endocrine Private Practice:

- St Vincent’s Clinic Sydney NSW
- Balmain Sports Medicine Sydney NSW
- Southern Endocrine Sutherland NSW

Endocrine Society Australia Representative: “DO IT Women's Health Clinical Advisory Committee” – CRE WHiRL: Centre For Research Women’s Health In Reproductive Life

Femmi: Medical director (Female Athlete Tech Start-Up/Female Athlete Health)

Medical Training

Endocrine Advanced Trainee - Royal Prince Alfred Hospital Sydney Feb 2023- Feb 2024

- Eating disorder fellow

Endocrine Advanced Trainee - St Vincent’s Hospital Sydney Feb 2022- Feb 2023

- Bone and Calcium + Transplant Endocrinology

Endocrine Advanced Trainee - The Canberra Hospital Feb 2021 – Feb 2022

General Medicine Advanced Trainee - Royal North Shore Hospital Feb 2020 - Feb 2021

Basic Physician Trainee - The Alfred Hospital, Victoria Feb 2016- Feb 2019

Internship - Royal Hobart Hospital, Tasmania Jan 2015 - Jan 2016

Research and Presentations

Publications

- Isobelle Smith, et al. "Timing of therapy in osteoporosis: does it matter?" *Medicine Today* 2022; 23(6): 14-23
- Isobelle Smith et al., "BEFIT study" (Barriers to Exercise and Fitness prescription In Training and clinical practice) *HREA* **1642**. Cross-sectional study assessing perceived barriers to prescribing exercise amongst GPs and endocrinologists. Submitted to *MJA* December 2024

Conference Presentations

- Smith, I, K. Quality in Diabetes Care – "*Diabetes Care in People with Cystic Fibrosis*" NSW state finalist May 2023
- Smith, I, K. "What to do AAFter Teriparatide" poster presentation (255) at: Australian and New Zealand Bone and Mineral and Society Annual Scientific Meeting October 2023.
- Smith, I, K., Hocking, S. "Bariatric Surgery and Pregnancy" case discussion at: Endocrine Society of Australia Seminar April 2023.
- Smith, I.K., "Scientific Communication and Social media" oral presentation at: Endocrine Society of Australia Annual Scientific Meeting November 2022.
- Smith, I.K., Greenfield, K. "The Three Ps" poster presentation (314) at: Endocrine Society of Australia Annual Scientific Meeting November 2022.
- Smith, I.K., Petersons, C. "Pheochromocytoma masquerades as Takotsubo cardiomyopathy" Poster presentation (425) at: Endocrine Society of Australia Annual Scientific Meeting November 2021.

Grand Round Presentations

- "*Tumour Induced Osteomalacia*". The Royal Prince Alfred Hospital Sarcoma Summit September Hospital 2023
- "*Adrenal crisis in pregnancy*". The Canberra Hospital May 2021.
- "*Hormonal Heartbreak/ Pheochromocytoma masquerading as Takotsubo cardiomyopathy*". The Canberra Hospital July 2021.

Academic teaching

Honorary Lecturer - University of Sydney (Central Clinical School)
2023

Honorary Lecturer- Australian National University (Canberra)
2021

Honorary Lecturer- University of Sydney (Sydney Adventist Clinical School)
2020

Clinical Tutor- University of Tasmania (Hobart Clinical School)
2013-2014

Volunteer and Community Activities

November ambassador (Men's health charity) **2012 - Present**

Volunteer ports medic - Sport and charity events e.g., Tour De Cure, ultra trail-running **2019 - Present**

Scientific communication and media health - Improving community health literacy through 2019-Present various media outlets including TV, radio, social media, health NGOs, podcasts and guest-speaking.

Professor Ian Caterson- Endocrinologist
The Royal Prince Alfred Hospital Sydney.
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