

## STRIDE\_Aged Care section

### July issue

#### Article header: Impact of menopause on foot health, structure and function

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#### Introduction

In this series on Healthy Ageing, it is interesting to consider a fundamental difference for women and men – the experience of menopause. Individual physiology, foot and limb mechanics, systemic pathology, and familial traits all act to influence foot structure and function as we age but it is only women who are impacted by a natural change in hormone levels in mid-life. Considering the proportion of podiatry clients who are older women, it is important for practitioners to understand the impact of menopausal hormone changes on foot structure and function.

In this article I will focus on:

- Menopause as a three-stage process and the associated hormonal changes
- The impact of menopause for women
- The effect of oestrogen on musculoskeletal tissues
- Quality of life and foot health related to menopause
- A 'new beginning' for hormone replacement therapy (HRT)

#### Article starts

Menopause is commonly referred to as 'the change of life'. It might be considered as an 'end' in relation to reproductive life but currently the focus is on menopause as a 'new beginning'.<sup>1</sup> The average age of menopause is 51 but the age range for naturally occurring menopause<sup>1</sup> is 45-55 years, with some women experiencing menopause in their 60s.<sup>2,3</sup>

Menopause is considered to be a three-stage process, marked by a decline in sex hormone levels.<sup>2,4</sup>

- **Perimenopause** refers to the 8-10 years before menopause.  
*Oestrogen levels generally decline in an irregular fashion*
- **Menopause** refers to the time when menstrual periods have stopped for at least a year  
*Progesterone production ceases after the final menstrual period*
- **Postmenopause** commences 12 months after menstrual periods have ceased  
*Testosterone production declines with ageing but continues after menopause*

#### Impact of menopause for women

The impact of menopause for women varies widely but it is understood as an inevitable part of the ageing process. Symptoms which women commonly associate with menopause are hot flushes, sweats, mood changes, disrupted sleep, lack of energy, loss of libido, menstrual irregularity, and weight gain.

The longer-term impacts of menopause, however, appear to be less well understood by women for example, osteoporosis and cardiovascular disease.<sup>5</sup> This is important to understand because the two

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<sup>1</sup> Premature menopause or premature ovarian insufficiency may occur before the age of 40 due to natural ovarian function ceasing, following surgery to remove the ovaries, or as a result of cancer treatments.<sup>3</sup>

leading causes of 'non-fatal burden of disease' for women aged 45-64 years are 'other musculoskeletal' (11%); and 'back pain and problems' (9.3%).<sup>6</sup>

### **The effect of oestrogen on musculoskeletal tissues**

The musculoskeletal impact of declining oestrogen levels during menopause is significant and helps to explain the burden of disease for women at this time of their life. Oestrogen has an important role in the maturation, development and ageing of bone, muscle and connective tissues.<sup>7</sup> Oestrogen regulates metabolism within these tissues to improve bone and skeletal muscle function, and to decrease stiffness in tendons and ligaments.<sup>7</sup>

As a woman's oestrogen levels fall during menopause, she will develop an increased risk of musculoskeletal injury and accelerated bone and muscle wasting. The consequences of reduced muscle mass and strength, in combination with reduced bone density, place older women in particular at risk of falls and falls-related injury. Balance decline for women has also been linked to menopause as a consequence of reduced quadriceps and hip abductor strength, and impaired flexibility.<sup>8</sup> Additionally, increased tendon stiffness seen with falling oestrogen levels, is associated with injury to the associated muscle.<sup>7</sup>

### **Quality of life and foot health related to menopause**

Foot pathology may not be uppermost in the minds of menopausal women but it is certainly relevant to consider the effect of reduced oestrogen levels for women in this age range and older, who present with musculoskeletal foot pain. In a study of 106 Spanish women aged 45-55 years, data collected using the Foot Health Status Questionnaire demonstrated statistical difference between menopausal and non-menopausal women for foot pain, general foot health and social capacity.<sup>9</sup> Evidence of a lower quality of life related to foot health for women experiencing menopause, helps to explain why this demographic typically comprises a large proportion of a podiatrist's caseload.

### **Menopause-associated foot pathology**

Weight gain during menopause is very common as low oestrogen levels promote the deposition of abdominal fat.<sup>2</sup> A lack of energy and reduced physical activity, may exacerbate weight gain. In a study of 81 postmenopausal women which investigated the relationship of age, body mass index (BMI) and muscle-tendon unit (MTU) stiffness, with foot arch structure, a high BMI was more commonly associated with a planus foot type and impaired foot function.<sup>10</sup>

Postmenopausal osteoporosis should be considered for women presenting with pain but no history of overuse or trauma to the metatarsal region.<sup>11</sup> During walking, a force of 110% of body weight is generated at heel strike; this increases to 250% during running.<sup>12</sup> Stress fractures in the foot most commonly affect the 2<sup>nd</sup> to 5<sup>th</sup> metatarsals. A stress fracture affecting the sesamoid bones is a potential differential diagnosis for pain plantar to the 1<sup>st</sup> metatarso-phalangeal joint; navicular fractures have been associated with basketball players and runners; and calcaneal fractures are typically linked to jumping activities. Distal fibular and medial malleolar fractures have also been attributed to postmenopausal osteoporosis.<sup>11</sup>

### **A 'new beginning' for hormone replacement therapy (HRT)**

The use of HRT by women, and the willingness of doctors to prescribe HRT, has been impacted over the years by the association of an increased risk of breast cancer, stroke and venous thromboembolism with progestogen components of HRT regimens. Current commentary, however,

indicates that ‘we are witnessing a ‘new beginning’ in the rebirth of menopausal hormone therapy (MHT)’.<sup>1</sup>

The International Menopause Society<sup>13</sup> published a [statement](#) on the use of HRT and risk of breast cancer. No increase in risk of breast cancer has been detected in women using dydrogesterone containing HRT for less than five years, however, limitations of the data are noted in the statement. A call for priority action to put the risks and benefits into perspective, concludes this statement:

‘The reports from observational data which unilaterally examine the risks of breast cancer, without simultaneously counterbalancing the multiple benefits of HRT, damage the confidence of healthcare providers and women ...’. This is a public health issue that requires prompt due care and attention with investment from multiple departments of health, or possibly the World Health Organisation, to finally resolve it.’

### **So what does this mean for podiatrists?**

If it is the case that women think less about becoming old and increasingly more about remaining young through their second life phase<sup>1</sup>, it may be relevant to review your understanding of menopause. Enabling physical activity through maintaining good foot health is beneficial to address the increased risk of weight gain and cardiovascular disease for older women. The benefits of exercise are also well-established for mental wellbeing.

Self-education about the impact of menopause for a woman, can equip you to discuss potentially sensitive topics such as concerns about hot flushes and overheating during exercise. If menopausal symptoms are not something that you would consider discussing with a client, why not? A little empathy goes a long way!

### **More information**

If you are interested in any of the issues raised here, I encourage you to take a look at:

- Australian Menopause Society (2021). What is menopause – information sheet.  
[https://www.menopause.org.au/images/infosheets/AMS\\_What\\_is\\_menopause.pdf](https://www.menopause.org.au/images/infosheets/AMS_What_is_menopause.pdf)
- International Menopause Society: ‘Promoting education and research on midlife women’s health’.  
<https://www.imsociety.org/>
- You might also be interested to promote ‘World Menopause Day’ in your practice. It is held every year on the 18th October.  
<https://www.imsociety.org/wp-content/uploads/2020/11/ims-hrt-2020-11-10.pdf>

### **References:**

1. Davis, S., (2018). Menopause – a new beginning. *Climacteric*, 21 (4), 306–307  
<https://doi.org/10.1080/13697137.2018.1481676>
2. Healthline. What health changes should you expect postmenopause? (2017).  
<https://www.healthline.com/health/menopause/postmenopausal-health>

3. Australian Menopause Society (2016). What is menopause – information sheet.  
[https://www.menopause.org.au/images/infosheets/AMS\\_What\\_is\\_menopause.pdf](https://www.menopause.org.au/images/infosheets/AMS_What_is_menopause.pdf)
4. The North American Menopause Society (NAMS). Changes in hormone levels. (2021).  
<https://www.menopause.org/for-women/sexual-health-menopause-online/changes-at-midlife/changes-in-hormone-levels>
5. Herbert, D., Bell, R.J., Bell, K., Young, H., Brown, J., Coles, Y., Davis, SR. (2020)  
Australian women’s understanding of menopause and its consequences: a qualitative study, *Climacteric*, 23(6): 622-628, DOI: 10.1080/13697137.2020.1791072
6. Australian Institute of Health and Welfare (2016). Australian Burden of Disease Study: impact and causes of illness and death in Australia 2011.  
<https://www.aihw.gov.au/reports/burden-of-disease/abds-impact-and-causes-of-illness-death-2011/contents/highlights>
7. Nkechinyere, C-O., Baar, K. (2018). Effect of estrogen on musculoskeletal performance and injury risk. *Frontiers in Physiology*, 9: 1834. Published online 2019 Jan 15. doi: 10.3389/fphys.2018.01834
8. Fu, S., Choy, L., Nitz, J. (2009). Controlling balance decline across the menopause using a balance-strategy training program: a randomized controlled trial. *Climacteric*, 12: 165-176. DOI: 10.1080/13697130802506614
9. Lopez Lopez, D., Lopez Martinez, N., Losa Iglesias, M., Rodriguez Sanz, D., Paolomo Lopez, P., Becerro de Bengoa Vallejo, R. (2016). Impact on quality of life related to foot health in a sample of menopausal women: a case–control observational study. *Climacteric*, 19(5): 501-505. <http://dx.doi.org/10.1080/13697137.2016.1198314>
10. Faria, A., Gabriel R., Abrantes, J., Bras, R., Noreira, H. (2010). The relationship of body mass index, age and triceps-surae musculotendinous stiffness with the foot arch structure of postmenopausal women. *Clinical Biomechanics*, 25: 588-593. doi:10.1016/j.clinbiomech.2010.02.014
11. Friedlander, AH., Lester, JJ. (2002). The Biology, Medical Management, and Podiatric Implications of Menopause. *Journal of the American Podiatric Medical Association* 92(8): 437-443.
12. Pegrum, J., Dixit, V., Padhiar, N. (2014). The pathophysiology, diagnosis, and management of foot stress fractures. *The Physician and Sports Medicine*, 42(4). DOI: 10.3810/psm.2014.11.2095
13. International Menopause Society <https://www.imsociety.org/>

14. Sydora BC., Alvdj T., Malley A., Mayan, M., Shandro, T., Ross, S. (2020). Walking together: women with the severe symptoms of menopause propose a platform for a walking program; outcome from focus groups. *BMC Women's Health*, 20(1): 1-8. [10.1186/s12905-020-01037-](https://doi.org/10.1186/s12905-020-01037-y)

[y](https://doi.org/10.1186/s12905-020-01037-y)