

## Pam's pigeon toes

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Correction of structural and functional foot problems, such as pigeon toes, can help patients with diabetes to increase their level of activity and fitness, lose weight, and, subsequently, improve their glycaemic control and level of comfort.

### Case history

Pam is 63 years old and has had type 2 diabetes for five years. Recently, her blood glucose control has not been ideal, with HbA<sub>1c</sub> values ranging from 7.9 to the current 8.8% over the last year (an ideal HbA<sub>1c</sub> is <7%). Pam is overweight (weight 61.2 kg; height 1.5 m; BMI 27.2 kg/m<sup>2</sup>). She takes metformin 850 mg twice daily and glipizide 10 mg twice daily.

You suggest that Pam increases her activity to help bring her blood glucose under control. Pam says she finds any form of walking difficult because she has corns that 'hurt like hell' and unstable ankles that turn laterally 'at the drop of a hat'.

On examination you note the obvious corns on the lateral aspect of both fifth toes, and that the nails of these toes are thicker than the other toenails. The soles of her shoes are worn down laterally, and the shoes are an unusual shape, curving medially from heel to toe. There is a clear

dent over the forefoot where the fifth toes are pushing. Pam explains that she always chooses soft leather shoes to minimise pressure on her corns. When she stands and walks, her feet point inward but her arch and heel angle look normal (Figure 1).

### Questions to consider

- Why is Pam pigeon toed?
- How can you assess factors that are contributing to Pam having pigeon toes?
- How can Pam's footwear be improved?
- How can Pam's risk of future foot problems be reduced?

### Why Pam is pigeon toed

The usual cause of pigeon toes in adults is a persistence of rotation of the whole lower leg by inward femoral twisting that does not correct itself during childhood. This inturning may be aggravated by tight hamstrings and calves, which limit any extension and tend to induce medial leg rotation when walking. Tight calves may also limit the range of movement of the ankles, reduce ankle stability and increase the tendency towards inversion sprains.

In addition to the above, Pam's previous ankle injuries, caused by her unstable ankles, have progressively weakened her ankle joints, further increasing ankle instability.

The total effect can be understood by



Figure 1. Pam's pigeon toes.

trying the following: walk with toes pointed inwards and with slightly flexed knees and ankles. The foot will strike the ground on the lateral forefoot, the flexed ankle will encourage inturning and the flexed knee will increase the tendency to stumble and put the whole body weight on the inverted, flexed, unstable ankle.

### Assessing contributing factors

As with all foot problems, check Pam's feet, her gait, her footwear and her foot-care.

Look at Pam's feet while she is standing and walking barefooted. See how much her feet point in when standing and whether the inpointing increases during walking. Can she stand with her feet flat, knees fully extended and back straight? If she can, how close can she get to touching her toes?

Standing with feet inpointing suggests femoral torsion. Inpointing that increases while walking as well as an inability to stand with flat feet and extended knees or limitation of hip flexion suggest tightness of the calves and hamstrings.

The soft leather of Pam's shoes may

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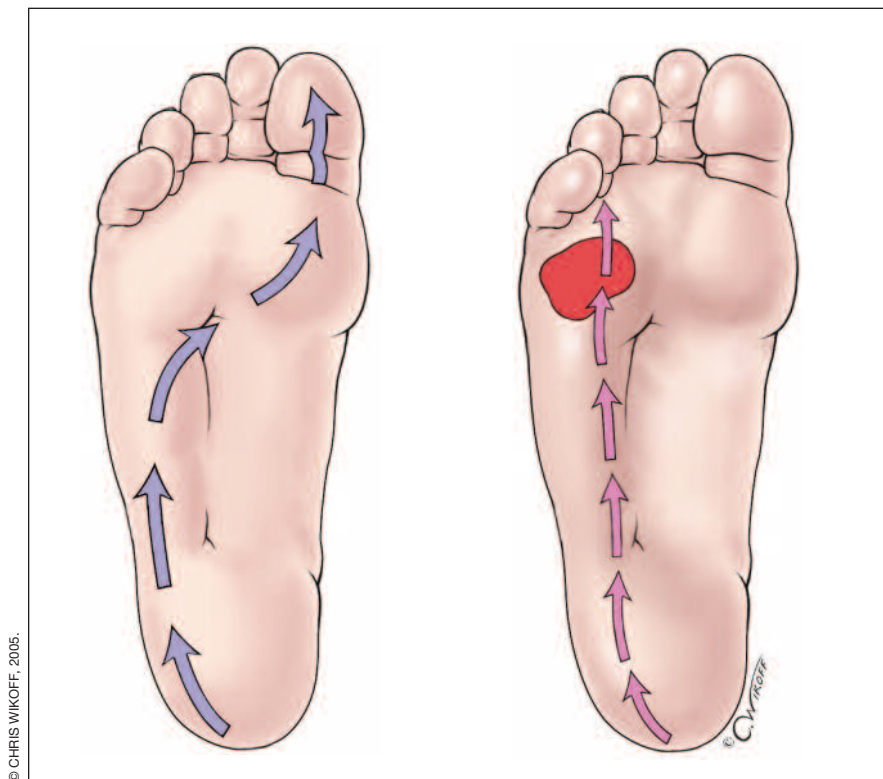


Figure 2. Force lines of a normal foot (stable loading; left) and Pam's foot (lateral loading; right). The inpointing and repetitive rolling and weakening of Pam's ankles produce force patterns similar to that of a high arched foot.

make her feet more comfortable and decrease pressure on her corns in the short term, but they don't support her feet. In the long term, pressure on her lateral forefoot and ankle instability will increase.

A podiatrist could advise Pam on appropriate corrective and supportive footwear, and a physiotherapist could suggest a program to increase ankle stability and knee extension.

Pam's corns can be treated, and she could be advised on how to keep the corn and thickened skin on her lateral soles under control (e.g. using a pumice stone after her shower and the liberal use of a moisturiser).

### Improving Pam's footwear

Pam may have a normal foot shape but the inpointing and the repetitive rolling

and weakening of the ankle produce force patterns during walking similar to that of a high arched foot (Figure 2).

Orthotics would distribute the load more evenly over the foot. Heel raisers can be used to allow for limited ankle flexion until this limitation is corrected by a physiotherapy program.

Pam's footwear can be modified as the structural and functional ankle joint and calf and thigh muscle problems are corrected.

### Reducing the risk of future foot problems

More appropriate shoes will help Pam, but the structural and functional problems need to be addressed. Pam should undertake an ankle rehabilitation program to increase her ankle strength, her sense of joint position, and the reflexes

that protect her ankles. She will also benefit from a 'stretching program' for her tight hamstring and calf muscles. Hydrotherapy sessions may be advised so she can exercise without straining her ankles.

Once her footwear, ankle and muscle problems are corrected, Pam's feet and gait may be normal enough to enable her to gradually increase her activity. She may then enter a 'virtuous cycle' (as opposed to the previous 'vicious' cycle) of increasing activity, increasing fitness and strength, decreasing weight and decreasing stress on her feet and ankles.

Walking more and weighing less will also improve Pam's glycaemic control, which was the reason her foot problems were discussed in the first place.

If, as occasionally occurs, these conservative measures do not make Pam's feet functional, she could be referred to an orthopaedic surgeon with a special interest in the lower limb for advice on surgery to reduce the femoral torsion causing her pigeon toes. **MT**

### References

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