

Polycystic Ovarian Syndrome and Fertility

Part 1



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What causes PCOS?

Polycystic Ovarian Syndrome (PCOS) is a condition that is becoming increasingly common. Women usually seek professional help if they are experiencing difficulty in conceiving, or if their menstrual cycle is very irregular. Sometimes it is because they are worried about being over weight or having bad skin.

It is not known exactly what causes PCOS but the general thinking is that there is likely to be a **genetic predisposition** in those girls or women who develop it. This is thought to involve genes related to the production of testosterone, and may also include those genes that predispose a woman to insulin resistance. In addition to these genetic factors, it is also thought that events in utero that affect the developing female fetus (such as Vitamin D deficiency, poor diet, exposure to pesticides) can influence the development of the disease. **Lifestyle factors** during early and middle life can also play a part in the development of PCOS. >>

The consequences of all the above factors can have negative effects on the function of the ovaries and the lining of the uterus, resulting in infertility.

Many women with PCOS characteristically carry excessive weight. However, it is not just women with PCOS who suffer from weight gain and obesity. Being overweight has become a modern day problem for many women.

As mentioned above, genetics is a factor in the development of PCOS but genetics alone rarely dictates the course of the disease. Other factors, such as environment and lifestyle also play a role in contributing to the development of PCOS. It is the development of insulin resistance that has a major impact.

As human beings, we are still genetically programmed to thrive on the habits of our ancestors, who ate nutrient-rich foods, a diet generally low in carbohydrates and who were much more active than we are today. In many ways, our environment and lifestyles have evolved too quickly for our bodies to keep pace.

It is the predominance of unhealthy lifestyles and diet, coupled with genetic predisposition that can cause the pancreas to overproduce insulin in an attempt to maintain normal blood glucose levels. Our muscle cells (and others) are overwhelmed by this excess insulin and so, in order to protect themselves, they reduce the number of insulin receptor sites on their surface.

“high levels of insulin in the blood stimulate the cells”

It is thought that women with PCOS possess a selective resistance to insulin (within the liver or muscle tissue), whereas other organs, for example the ovaries, are able to maintain normal sensitivity to insulin. The result is that high levels of insulin in the blood stimulate the cells that surround the follicles in the ovary, causing them to enlarge and produce excess testosterone. This has the effect of interfering with ovary function and the menstrual cycle. »



Nearly twenty years ago clinicians noticed that the oral contraceptive pill contributed to deterioration in glucose tolerance. This has been confirmed by more recent studies, which have shown an increased risk of developing insulin resistance in women with or without PCOS after taking the oral contraceptive pill.

Many specialists are concerned about this result as well as the metabolic effects of PCOS, and are now recommending that use of contraceptive pills be limited or avoided if possible. It is not just oral contraceptives that are to blame. Transdermal and vaginal contraceptives have the same effect. Depo-Provera* also causes weight gain, often up to 10 kg, which in turn leads to fertility problems.

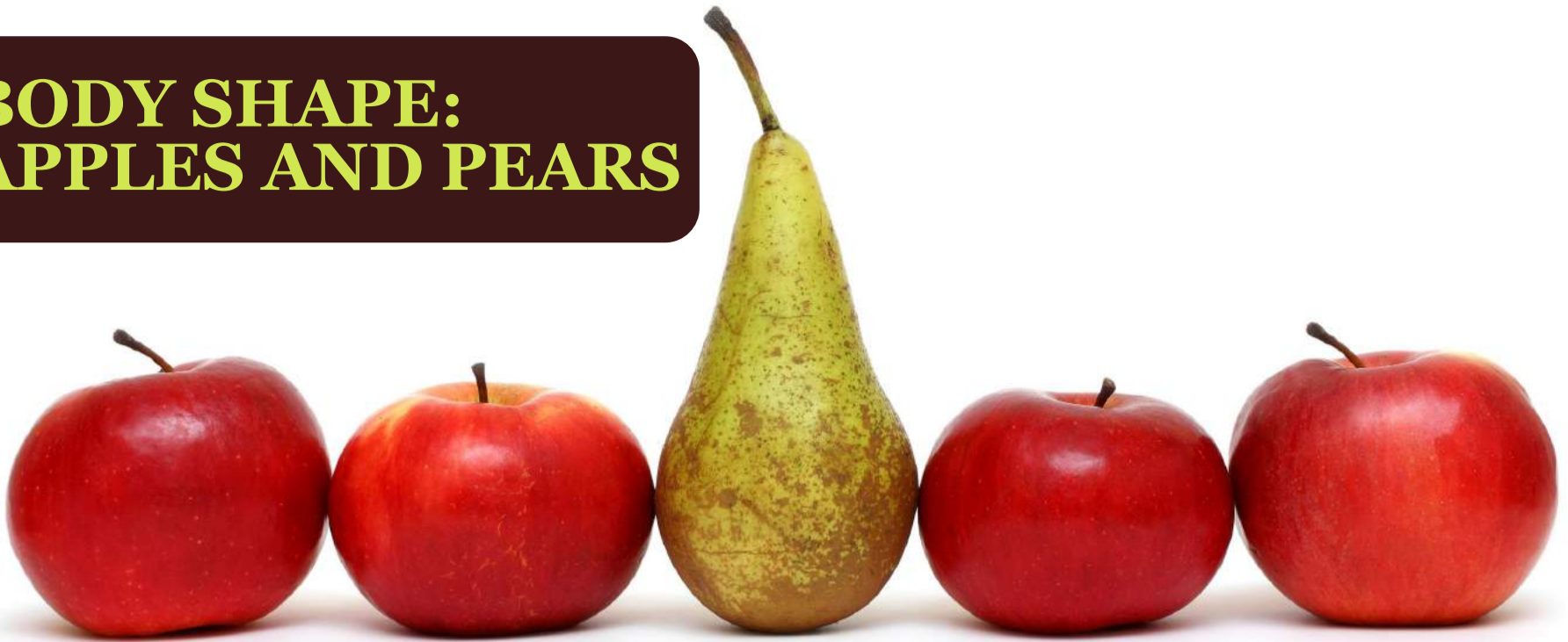
*** Depo Provera is a hormone used for contraception. It is given by injection and its effects will last for three months at a time. It is similar to progesterone, which is one of the two main hormones made by a woman's ovaries during her normal cycles.**



The severity of PCOS can be affected by the percentage of body fat a woman carries. Specialists in Australia report that at least 50% of their patients with PCOS are obese. (The bench-mark for female obesity is a waist measurement of 80 cm.)

There seems to be a 'chicken and egg' scenario with PCOS. Obesity undoubtedly worsens the presentation of PCOS, but it is also thought that PCOS itself leads to a predisposition to obesity. However, it isn't necessarily extreme weight or obesity that causes a problem in women predisposed to PCOS. Sometimes the weight gain itself (even as little as 10% of body weight) can be enough to affect the ovaries. »

BODY SHAPE: APPLES AND PEARS



The typical PCOS patient presents with excess weight around the abdomen. This is also typical of patients associated with insulin resistance and other metabolic disorders. Both over-weight or normal weight PCOS patients have consistently higher waist-to-hip ratios (indicating increased abdominal fat mass) when compared with women without this condition.

Overweight women without PCOS tend to be heavier in the thigh and buttocks area rather than the abdomen. We refer to these women as gynoid, or pear-shaped, and those with excess abdominal weight as android or apple-shaped.



Is a big stomach more to be concerned about than a big bottom?

Many researchers think visceral fat, i.e., deposits of fat around the abdominal organs is to blame, as opposed to subcutaneous fat, under the skin. Visceral fat is more metabolically active than subcutaneous fat. >>



STRESS

Stress is another important factor that contributes to PCOS. It might be of interest to those women who work 9 – 14 hours a day in professions such as law or finance that clinicians have observed a higher rate of PCOS patients within these professions. Studies have shown that increased stress and sympathetic nervous system activity causes development of PCOS-like characteristics and infertility in animals.

CAN WEIGHT LOSS HELP?

The answer is yes, losing weight greatly benefits PCOS sufferers. They aren't the only women to benefit from shedding some excess kilos, as there is also sound evidence that **weight loss improves fertility generally, in all women, whether they have PCOS or not.** This applies to women trying to conceive spontaneously, as well as those undertaking attempts at IVF pregnancies. There are two main benefits to be gained by reducing obesity: one is an increase in ovulation frequency and the second is an improvement in the environment in which the eggs themselves mature.

However, weight loss for women with PCOS, is not easy to achieve, despite the best of intentions. These women tend to have an increased susceptibility to weight gain and/or find it harder to lose weight than women who don't have PCOS.

This is because they are inclined to have high levels of insulin, which acts to encourage the body to increase fat storage. This in turn creates more insulin resistance, which increases blood insulin more and thereby leads to even more weight gain. It seems like a vicious circle >>



It also may be the case that appetite signals in women with PCOS are abnormal. These women produce too much ghrelin* and leptin* resistance in the brain. This means that the brain doesn't get the appropriate appetite suppression messages, which results in a higher satiety level whereby PCOS patients need to eat more to feel satisfied. The resultant increased cravings for carbohydrates are associated with elevated androgen levels.

***Ghrelin is a hunger-stimulating hormone and peptide. The levels of ghrelin increase before a meal and decrease after a meal. Leptin, the counterpart of ghrelin, is a hormone that regulates energy intake and expenditure, including hunger/appetite and metabolism.**

It's not all bad news though as it only takes a relatively small weight loss and body fat redistribution to start the ovaries working again. Just enough to change the waist-to-height ratio, estimated at 5 – 10% of initial body weight (or even just 5 kg), will improve a range of PCOS characteristics.

These encompass metabolic, reproductive and psychological features of PCOS, including menstrual function, excess testosterone, insulin resistance, glucose tolerance, abnormal lipid levels, ovulation, pregnancy and overall quality of life.

These benefits can be felt after the loss of just a small volume of critical intra-abdominal fat, perhaps even only a small percentage of the total body fat. »

Which diet is best for weight loss in PCOS?

This is an extensive and fascinating topic and to date, there is not enough evidence to confidently recommend one specific diet for all women with PCOS. Even though some diet types may be more beneficial for metabolic status, it is important to consider individual constitutions and preferences, so that the diet will be effective and will be maintained. Because we are aiming to bring the most benefit to the patient, any changes in diet and exercise routine must be amenable to the person involved.

High protein, low glycemic index meals are generally recommended as they are relatively low in calories, do not raise blood sugar and do not produce as much insulin. They act to control hunger well. Proteins contain high amounts of leucine**. This is just one suggested approach to achieving and sustaining weight loss for PCOS sufferers. Other methods could include calorie counting and meal replacements. >>

** **Leucine is an essential amino acid which assists to regulate insulin levels, blood sugar and energy levels.**





It is also known that the inclusion of dietary fiber at each meal (e.g., from whole grains such as oats and barley or pulses) or in the form of a supplemental fiber such as psyllium, also appears to be helpful in controlling insulin levels. Microbes in the large intestine act to promote fermentation of the fiber, creating short-chain fatty acids, which then reduce insulin resistance. Despite the lack of definitive data from human studies, women and girls with PCOS are often advised to avoid soy products. This is to prevent an extra load of phytoestrogens from further disrupting the hormonal environment.

A change in diet alone is not the key to the success of a weight loss program. Equally important is **the ongoing support** given to the patient trying to reach her weight loss goal. Crucial factors in the ongoing success of weight loss programs include measures such as goal setting, weight monitoring and individualization of the program. Follow-up and monitoring by a healthcare practitioner and support from family or friends are also very important. In addition, factors such as **stress, eating patterns (including emotional triggers), and self-esteem need to be addressed.**

Exercise alone will not make a lot of difference to a person's success in achieving weight loss but it is helpful for PCOS patients because it can improve insulin resistance (even without loss of weight) and so should be incorporated into a treatment program. Exercise benefits PCOS sufferers by increasing skeletal muscle insulin sensitivity, with the result that there is less insulin present in the blood, meaning that less glucose is converted to fat. »»

High intensity interval training (alternating fast and slow paced exercises) has been shown to be effective at reducing insulin resistance and does not demand a lot of time commitment.

Additionally, exercise has been shown to have a specific effect in shrinking abdominal fat cells. Exercise is also important in that it is associated with a reduction in Cortisol, the hormone released when we are stressed. This hormone specifically promotes visceral fat deposits.



In the next issue, Jane Lyttleton will discuss various treatments for PCOS, including those that are pharmaceutical and surgical, as well as from a traditional Chinese medicine viewpoint.

To access Jane Lyttleton's website tap **HERE**

ABOUT THE AUTHOR

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Jane Lyttleton began her studies in science in NZ and then London with doctoral studies in genetics before succumbing to the siren song of Chinese medicine. She is the author of *Treatment of Infertility with Chinese Medicine* (Elsevier) published in 2004 (2nd Edition 2013) by Elsevier Science and now in its 7th reprint in English, and several other languages, and is in great demand world wide as lecturer.

She has always had a keen interest in the way Chinese medicine can be applied to gynaecological disorders in a modern western context, and has run TCM clinics in women's health centres and general medical centres since the early 80s. In addition to her own busy practice, she has established a number of clinics, which work with IVF clinics and universities and are providing the platform for data collection and clinical research.

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