

SHOULD *YOU* BE TAKING CREATINE?

It's seen as the supplement of gym jocks, but new research suggests creatine may boost not just muscle strength but also brain health, improving memory, energy and even sleep – especially for perimenopausal and menopausal women.

BY GLYNIS HORNING



IF you've reached perimenopause or menopause, chances are your memory of the 1992 Barcelona Olympics is simply that stirring theme song, sung solo by Montserrat Caballé at the opening because composer Freddie Mercury had died of Aids the previous year. Your partner, on the other hand, if they're into exercise, may remember this as the event where creatine supplementation first hit headlines, credited with helping five British athletes take gold.

In the more than 30 years since, creatine has become one of the most widely used nutritional supplements, taken to enhance energy, performance and recovery. It's also one of the most effective, reports the International Society of Sports Nutrition (ISSN) in its 'Position stand: safety and efficacy of creatine supplementation in exercise, sport and medicine', published in the *Journal of the International Society of Sports Nutrition* in 2017.

Recent research has turned to creatine's effects on the brain, and its potential to improve mental wellbeing, from memory to mood. And evidence is emerging that supplementation may be beneficial not just for athletes honing a competitive edge or gym bros building a hotter bod, but also for older adults, aged 66 to 76 – as well as perimenopausal and menopausal women.

WHAT IT IS

Creatine is a compound identified 150 years before the Barcelona Olympics by French chemist Michel Eugène Chevreul, who in 1832 extracted it from meat ('*kreas*' is Greek for 'flesh'). Creatine is produced naturally by animal bodies, including your own – mainly in the liver, from amino acids (glycine, methionine and arginine) and enzymes. You also derive it from animal foods you eat, such as red meat, seafood, eggs and animal milk.

Your body converts creatine into phosphocreatine, storing about 95% in your muscle cells, and 5% in your liver, kidneys and brain, reports the *Journal of the International Society of Sports Nutrition.* This is used to regenerate adenosine triphosphate (ATP) – the primary source of energy for cells. During intense physical exercise, ATP is rapidly depleted, and creatine helps to quickly restore it for immediate energy, allowing muscles to continue working at high intensity.

About 2% of your body's creatine store is converted for use each day by your liver, kidneys and pancreas, and carried through the blood to be used by parts of your body with high energy demands, especially the muscles and brain.

WHY YOU MAY NEED SUPPLEMENTATION

According to a 2021 study published in the journal *Nutrients,* women have 70–80% lower stores of endogenous creatine (creatine produced by the body) than men, possibly due to the hormonal changes in our reproductive cycle. And, say the authors, 'creatine supplementation among pre-menopausal females appears to be effective for improving strength and exercise performance'.

Post-menopausal women can also experience 'benefits in skeletal muscle size and function' and 'favourable effects on bone when combined with resistance training'.

What's more, they say, 'clinical evidence indicates positive effects from creatine supplementation on mood and cognition, possibly by restoring brain energy levels and homeostasis (balance)'.

Effects such as these are now being recognised as useful to help counteract the negative effects of menopause. As your ovaries gradually stop working, your body stops burning calories and fat as easily, which can lead to weight gain, especially around the midriff, says gynaecologist and menopause specialist Dr Natalia Novikova. 'You also lose bone density, raising the risk of osteoporosis and fractures, and can experience mood swings, irritability, anxiety, depression and insomnia.'

HOW A SUPPLEMENT MAY HELP

- **It improves exercise performance.** Numerous studies have established this – and it's been found that because women have naturally lower creatine stores than men, we respond better to supplementation. A meta-analysis published in the *International*

Journal of Sport Nutrition and Exercise Metabolism found that women supplementing with creatine for 10 weeks showed a 15% increase in exercise performance, against just 5.5% in men.

Various mechanisms are cited for creatine's improvement of performance, but the main one is that you have more energy available due to increased ATP turnover when you exercise, so you tire less rapidly and can continue longer. This may also make for a more enjoyable workout, motivating you to keep exercising.

'It is important to note that creatine's musculoskeletal and strength effects are maximised when you are exercising, not just taking a supplement,' says Dr Demitri Constantinou, an adjunct professor in the Department of Exercise Science and Sports Medicine at Wits University. 'In addition, physical activity itself has benefits when it comes to strength, mood, anxiety and sleep, and reduces the risk of cognitive impairment – so being active when supplementing with creatine implies a greater benefit.'

• It boosts muscle mass and strength. Menopause aside, ageing causes progressive loss of muscle mass and strength (sarcopenia), and with that, of bone density. Along with a loss of strength, this can bring an increased risk of insulin resistance in ageing skeletal muscle, notes a 2020 article in the journal *Diabetology & Metabolic Syndrome.* The upshot is that the European Food Safety Authority now recommends creatine supplementation of at least 3 g a day, along with regular resistance training 'of moderate intensity' three times a week, to improve muscle growth in adults from age 55.

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• It may boost mood, memory and mental health. Women in South Africa, like those elsewhere, report 'significantly more depressive symptoms than men', notes a 2023 study in the journal *Social Science & Medicine.* And research in the last 20 years suggests that creatine influences mood and cognition, and that supplementation may help counter depression and stress – although exactly how creatine may affect brain function is not known, Dr Constantinou says.

In 2023, a systematic review and analysis of clinical trials in *Nutrition Reviews* confirmed that supplementation helped memory in healthy adults, especially those aged 66 to 76. In addition, a 2024 study in *Nutrients* showed creatine supplementation may increase total sleep when combined with resistance training, 'findings particularly important for those consuming a diet habitually low in creatine sources', even if they are not vegetarian.

HOW MUCH SHOULD YOU TAKE?

Creatine supplements are typically manufactured from synthetic forms of sarcosine (an amino acid found in animal products and plant-based foods like nuts and legumes) and cyanamide (not to be confused with cyanide!), also found in plant-based foods. The dosage depends on body weight, fitness level and diet, and vegetarians and vegans will need more. It's important to discuss this with your healthcare provider, especially if you have health issues or take medication or other supplements. In general, 3–5 g a day is recommended for improved muscle performance and brain health. High doses may sometimes lead to diarrhoea.

Some sports scientists advocate a 'loading phase' – taking 10–20 g of creatine for five days, then a maintenance of 2–5 g a day – but others, including the ISSN, say this is unnecessary, and that 'lower, daily dosages of supplementation (3–5 g a day) are effective for increasing intramuscular creatine stores'. They caution that taking creatine may lead to increased body weight, but stress this is due to muscle or water weight, not fat.

Creatine can be taken at any time of the day, but 'to enhance muscle creatine uptake, it should be consumed along with a post-exercise recovery meal of protein and carbohydrates, such as egg on toast or a smoothie with yoghurt and fruit', advise dietitians Marie MacGregor and Dr Natasha Driescher-Engelbrecht of the Sports Science Institute of South Africa. 'And before considering a supplement, address your diet – you cannot build muscle with an inadequate macronutrient intake.'

'You should always take the creatine with at least one cup of fluid,' adds Joburg dietitian and ADSA spokesperson Lila Bruk. 'And it's important not to take it with excessive amounts of caffeine as this may increase the risk of stroke.'





PHOTOGRAPHS: GALLO IMAGES/GETTY IMAGES

BOTTOM LINE: HOW SAFE IS CREATINE?

Creatine supplements have now been widely used for many years without ill effect, and provided you keep to reputable brands, preferably in the most studied and available form, creatine monohydrate (recognised by the FDA as a safe ingredient in 2020), and take them as directed, they are safe for most people, the ISSN has concluded.

But although the ISSN adds that supplementation has not been found to affect kidney function in healthy people, authorities such as the Mayo Clinic and Dr Constantinou advise caution for people with kidney or liver disease, or if patients are taking medication that may affect kidney function. 'In such cases, it should be taken under the supervision of a doctor,' Dr Constantinou says.

Some also note that not all women experience benefits from creatine – so if you notice no effects after two months, speak to your healthcare provider about quitting.

I plan to do so – if I have not noticed an improvement by the time you read this. Yes, the potential benefits of creatine are more than this post-menopausal vegetarian hack can resist, even though my request for comment from the South African Menopause Society has been turned down. (They feel that 'despite literature searches' there is 'limited knowledge/evidence to adequately and accurately comment'.)

I knocked back my first dose at the keyboard this morning. ❖

THE MYTHS AROUND CREATINE

There are now well over 500 peer-reviewed published articles on creatine supplementation, but questions remain. To address them, in 2021, the *Journal of the International Society of Sports Nutrition* (Vol 18) reported that an internationally renowned team of researchers had performed an evidence-based evaluation of the literature around creatine supplementation. These were their findings, in summary:

• Is creatine an anabolic steroid?
No, it has a completely different chemical structure.

• Does creatine cause kidney damage/ renal dysfunction?
Taken at recommended dosages, it does not.

• Does creatine supplementation cause hair loss/baldness?
Current evidence does not indicate this.

• Does creatine lead to dehydration and muscle cramping?
Experiential and clinical research does not validate this notion.

• Does creatine supplementation increase fat mass?
It does not.

• Is creatine beneficial for older adults?
There is growing evidence showing supplementation, particularly when combined with exercise, provides musculoskeletal and performance benefits in older adults.

• Is creatine only useful for resistance/ power-type activities?
A variety of athletic events, not just resistance/power activities, may benefit from creatine supplementation.

Is creatine only effective for males?
There is accumulating evidence that creatine supplementation has the potential to be a multifactorial therapeutic intervention across the lifespan of females, with little to no side-effects.

Are other forms of creatine similar or superior to monohydrate, and is creatine stable in solutions/beverages?
Some forms of creatine may be more soluble than creatine monohydrate when mixed in fluid, but research clearly shows creatine monohydrate to be the optimal choice.