

# **New study explores the options for astronauts who want to prevent menstrual bleeding during their space missions**

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A new paper in the journal *npj Microgravity* explores the options for astronauts who want to prevent menstrual bleeding during their space missions. The paper, written by authors at King's College London and Baylor College of Medicine, reviews contraceptive devices available including those already used by military and aviation personnel, and calls for more research into the effect of hormone treatments on bone mineral loss in space.

Although full amenities are available should astronauts choose to menstruate in space, the practicalities of menstruating during pre-flight training or spaceflight can be challenging. For short duration missions, menstrual cycles can to be timed according to mission dates but for longer hauls, menstrual suppression is often preferred.

During long duration missions, astronauts have traditionally continuously taken the combined oral contraceptive (COC) pill to prevent menstrual flow. A three-year exploration class mission is predicted to require approximately 1,100 pills, whose packaging would add mass and disposal requirements for the flight.

Long acting reversible contraceptives (LARCs) such as IUDs and subdermal (beneath-the-skin) implants are also safe and reliable methods for this purpose but as of yet, have not been extensively used by astronauts. Opting for a LARC would however remove the upmass,

packaging, waste and stability issues as a device could be inserted prior to a mission and replacement would not be required in-flight.

It is up to individuals to choose which method to use but LARCS appear to have a number of advantages for spaceflight, according to the paper's authors.

From an operational perspective, LARCs would not be expected to interfere with the ability of the astronaut to perform her tasks. There are no reports in the scientific literature suggesting high G loading experienced during launch or landing would damage a subdermal implant or shift the position of an IUD. However, consideration may need to be given as to whether the implant could rub or catch on specialist equipment or attire such as a diving suit or extra-vehicular activity suit.

The effect of hormone treatments on [bone mineral](#) density (BMD) is another issue for spaceflight, where astronauts lose bone at a much higher rate than on Earth. Previous studies have found a reduction in BMD with some contraception choices, namely the progestin only injection (DMPA), and whilst on earth these reductions are temporary, due to irreversible spaceflight related bone changes a treatment option which may impact BMD may not be advised. It is unknown whether taking the pill continuously would help protect against bone mineral loss. The authors call for further research to understand the impact of the COC in combination with microgravity, on bone mass density in women.

The paper concludes that astronauts should be provided with up-to-date, evidence-based information to make informed decisions about menstrual suppression if it is desired.

The uniqueness of spaceflight provides many challenges in conducting research, as the number of subjects required for clinical studies cannot

be matched by the number of current active female astronauts. The authors suggest that combining pharmacological data from spaceflights with equivalent ground-based studies investigating menstrual suppression might provide the evidence required to trial LARCs during spaceflight.

Dr Varsha Jain, Visiting Researcher at the Centre of Human and Aerospace Physiological Sciences (CHAPS) at King's College London and NIHR Academic Clinical Fellow in Obstetrics and Gynaecology, said:

"Studies of women in the military have shown that many would like to suppress their [menstrual flow](#) during deployment, but only a proportion of them use the pill to do so; the majority of women surveyed also wanted more advice from the military to help them make the right choice.

"With more women going into space, we need to ensure they also have the most up-to-date information on reliable contraception and means of menstrual suppression. It is ultimately the woman's choice to suppress, but options should be available to her should she decide to do so."?

Dr Virginia Wotring, Assistant Professor at the Center for Space Medicine, Baylor College of Medicine, said:

"For any woman, choice of a contraceptive requires careful consideration of benefits and risks with respect to her lifestyle and needs. The spaceflight environment adds some extra complexity to the overall equation, and we want female crewmembers to be able to make well-informed choices for their missions. Because loss of [bone mineral density](#) is known to occur on [spaceflight](#) missions, we need more data regarding health effects, including bone health, with long-term use of hormone treatments not just for contraception (as most women use them), but also for the less-common use to suppress menses."

**More information:** Varsha Jain et al, Medically induced amenorrhea in female astronauts, *npj Microgravity* (2016). [DOI: 10.1038/npjmgrav.2016.8](https://doi.org/10.1038/npjmgrav.2016.8)

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