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## HORMONAL CONTRACEPTIVES AND ACNE: A COMPARATIVE ANALYSIS BETWEEN HORMONAL IUD AND OTHER METHODS

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**Abstract: INTRODUCTION** Hormonal contraceptives play a dual role in reproductive health and dermatological outcomes, particularly in relation to acne. Hormonal IUDs, which release progestins, are associated with an increased risk of acne due to their androgenic activity. Conversely, combined oral contraceptives (COCs) demonstrate efficacy in reducing acne severity through estrogen's counteraction of androgenic effects. Specific formulations with antiandrogenic progestins, such as drospirenone, show the most significant dermatological benefits, highlighting the role of hormonal composition in treatment outcomes. **OBJETIVE** To evaluate the impact of hormonal contraceptives, particularly hormonal IUDs and combined oral contraceptives, on acne severity and management. **METHODS** This is a narrative review which included studies in the MEDLINE – PubMed (National Library of Medicine, National Institutes of Health), COCHRANE, EMBASE and Google Scholar databases, using as descriptors: “Hormonal IUDs” OR “Acne vulgaris” OR “Combined oral contraceptives” OR “Progestin androgenicity” OR “Dermatological outcomes” the last 5 years. **RESULTS AND DISCUSSION** Clinical evidence reveals that hormonal IUDs may exacerbate acne in predisposed individuals, including those with polycystic ovary syndrome. Randomized controlled trials emphasize the superiority of COCs in managing inflammatory and non-inflammatory acne lesions by regulating hormonal imbalances. Patients using progestin-only contraceptives experience variable dermatological outcomes, with some reporting worsening acne, underscoring the need for personalized contraceptive counseling and integrated care. **CONCLUSION** Contraceptive choice should consider individual dermatological profiles to optimize outcomes. Hormonal IUD discontinuation can lead to transient acne flare-ups, further complicating management. Future research should aim to refine contra-

ceptive formulations, minimizing dermatological side effects while maintaining efficacy, ultimately improving both reproductive and dermatological health in affected populations.

**Keywords:** Hormonal IUDs; Acne vulgaris; Combined oral contraceptives; Progestin androgenicity; Dermatological outcomes.

## INTRODUCTION

Hormonal contraceptives have long been a cornerstone in the management of reproductive health, with their impact extending beyond contraception to include significant effects on skin health<sup>1</sup>. Acne, a multifactorial dermatological condition, is profoundly influenced by hormonal fluctuations, making hormonal contraceptives a logical intervention in its management<sup>1</sup>. Among these, hormonal intrauterine devices (IUDs) have gained attention for their unique hormonal profile and localized effects, setting them apart from other contraceptive methods<sup>1</sup>. However, the comparative effectiveness of hormonal IUDs versus other hormonal contraceptives in managing acne remains an area of ongoing investigation and debate<sup>2</sup>. The interplay between the systemic and localized hormonal effects of these contraceptives on the sebaceous gland and inflammatory pathways forms a critical area of exploration, highlighting the need for evidence-based approaches tailored to individual patient profiles<sup>2</sup>.

Acne pathophysiology is deeply rooted in the influence of androgens on sebaceous gland activity and keratinocyte proliferation<sup>3</sup>. Androgens, particularly dihydrotestosterone, stimulate the sebaceous glands to produce excess sebum, creating an environment conducive to the proliferation of *Cutibacterium* acnes and subsequent inflammation<sup>3</sup>. Hormonal contraceptives exert their therapeutic effects on acne by modulating androgen levels, either through systemic suppression or by introducing progestins with anti-androgenic

properties<sup>3</sup>. While combined oral contraceptives (COCs) containing both estrogen and progestins are well-established in this role, the rise of hormonal IUDs—particularly those releasing levonorgestrel—has introduced a nuanced discussion about the balance between contraceptive efficacy and dermatological outcomes<sup>4</sup>. Unlike COCs, hormonal IUDs primarily exert local effects on the endometrium, with minimal systemic absorption, raising questions about their effectiveness in addressing androgen-driven acne<sup>4</sup>.

Historically, the association between hormonal contraceptives and acne control was recognized shortly after the introduction of the first oral contraceptive pills in the 1960s<sup>5</sup>. Early formulations, characterized by high doses of estrogen and androgenic progestins, often exacerbated acne<sup>5</sup>. Subsequent generations of contraceptives saw the development of low-dose estrogen combinations and the inclusion of progestins with anti-androgenic properties such as drospirenone and cyproterone acetate<sup>5</sup>. These advancements underscored the pivotal role of hormonal modulation in acne management, shifting the focus toward individualized contraceptive selection based on a patient's dermatological and hormonal profile<sup>6</sup>. Hormonal IUDs, however, emerged later, primarily as a highly effective contraceptive option rather than an acne treatment, necessitating further investigation into their potential dermatological implications<sup>6</sup>.

The role of estrogen and progestins in acne regulation is complex, involving multiple mechanisms that reduce androgenic stimulation of sebaceous glands<sup>7</sup>. Estrogen increases the production of sex hormone-binding globulin (SHBG), which binds free androgens in the circulation, thereby reducing their bioavailability<sup>7</sup>. Progestins, depending on their androgenic or anti-androgenic properties, can either exacerbate or ameliorate acne symptoms<sup>7</sup>. Hormonal IUDs, which predominantly

release progestins such as levonorgestrel, have sparked debate due to their potential to induce or worsen acne in susceptible individuals<sup>8</sup>. This paradox highlights the critical need for understanding the hormonal profiles of contraceptives and their systemic versus localized effects, particularly in patients with predisposing factors for acne<sup>8</sup>.

A comparative analysis of hormonal contraceptive methods reveals distinct differences in their dermatological effects<sup>9</sup>. Combined oral contraceptives are widely regarded as effective in managing moderate to severe acne, with multiple randomized controlled trials supporting their use<sup>9</sup>. In contrast, progestin-only methods, including hormonal IUDs, implants, and injections, present a more variable impact on acne<sup>9</sup>. Hormonal IUDs, for instance, deliver progestins directly to the endometrium, minimizing systemic hormone levels but potentially influencing sebaceous gland activity through localized mechanisms<sup>10</sup>. This contrasts with the systemic anti-androgenic effects observed with COCs, which directly modulate circulating androgen levels<sup>10</sup>. Understanding these differences is crucial for tailoring contraceptive choices to individual patient needs, particularly for women seeking both effective contraception and acne management<sup>11</sup>.

Acne remains one of the most common dermatological complaints among reproductive-aged women, often exacerbated by hormonal fluctuations associated with the menstrual cycle, pregnancy, and other life stages<sup>11</sup>. The impact of systemic hormone levels on acne severity underscores the importance of hormonal regulation as a therapeutic target<sup>11</sup>. Hormonal contraceptives, particularly those with anti-androgenic properties, offer a dual benefit of contraceptive efficacy and acne improvement<sup>12</sup>. However, the role of hormonal IUDs in this context remains less well-defined, with conflicting evidence regarding

their dermatological outcomes<sup>12</sup>. While some studies report an improvement in acne with hormonal IUD use, others suggest a potential for acne exacerbation, necessitating further research to elucidate these relationships<sup>12</sup>.

Evidence-based approaches to acne treatment with hormonal contraceptives involve a comprehensive understanding of individual patient profiles, including hormonal imbalances, acne severity, and response to previous treatments<sup>13</sup>. For patients with moderate to severe acne, COCs containing low-androgen progestins and adequate estrogen levels are often recommended<sup>13</sup>. Hormonal IUDs, while primarily designed for contraception, may offer benefits in acne management for certain patients, particularly those seeking long-term contraception with minimal systemic hormone exposure<sup>13</sup>. However, the potential for progestin-induced acne exacerbation must be carefully considered, emphasizing the need for individualized treatment plans and shared decision-making between patients and healthcare providers<sup>14</sup>.

## OBJETIVES

To evaluate the impact of hormonal contraceptives, particularly hormonal IUDs and combined oral contraceptives, on acne severity and management.

### SECONDARY OBJETIVES

1. To compare acne outcomes between hormonal IUD users and combined oral contraceptive users.
2. To assess the role of progestin androgenicity in acne exacerbation.
3. To explore the influence of contraceptive choice in patients with hormonally driven acne, including those with PCOS.
4. To analyze long-term dermatological outcomes in patients using hormonal contraceptives.

## METHODS

This is a narrative review, in which the main aspects of the impact of hormonal contraceptives, particularly hormonal IUDs and combined oral contraceptives, on acne severity and management in recent years were analyzed. The beginning of the study was carried out with theoretical training using the following databases: PubMed, sciELO and Medline, using as descriptors: “Hormonal IUDs” OR “Acne vulgaris” OR “Combined oral contraceptives” OR “Progestin androgenicity” OR “Dermatological outcomes” in the last 5 years. As it is a narrative review, this study does not have any risks.

Databases: This review included studies in the MEDLINE – PubMed (National Library of Medicine, National Institutes of Health), COCHRANE, EMBASE and Google Scholar databases.

The inclusion criteria applied in the analytical review were human intervention studies, experimental studies, cohort studies, case-control studies, cross-sectional studies and literature reviews, editorials, case reports, and poster presentations. Also, only studies writing in English and Portuguese were included.

## RESULTS AND DISCUSSION

The role of hormonal intrauterine devices (IUDs), particularly those releasing levonorgestrel, has been extensively studied for their dermatological effects, notably in the context of acne vulgaris<sup>15</sup>. Research indicates a clear association between hormonal IUD use and an increased incidence or exacerbation of acne<sup>15</sup>. For instance, comparative studies have demonstrated that hormonal IUD users exhibit a higher prevalence of acne compared to individuals using non-hormonal copper IUDs<sup>15</sup>. This suggests that the progestin component of hormonal IUDs may significantly influence sebaceous gland activity by enhancing sebum production, a key factor in acne

pathogenesis<sup>16</sup>. On the other hand, combined oral contraceptives (COCs), which contain both estrogen and progestin, have shown a beneficial effect on acne symptoms<sup>16</sup>. The estrogen component in COCs acts by countering androgenic activity, which reduces sebaceous gland stimulation and sebum production<sup>16</sup>. Certain formulations, such as those including drospirenone—a progestin with antiandrogenic properties—are particularly effective in mitigating both inflammatory and non-inflammatory acne lesions<sup>16</sup>. This highlights the crucial role of estrogen in the dermatological advantages associated with COCs<sup>17</sup>.

In contrast, progestin-only contraceptives, including specific hormonal IUDs and subdermal implants, are more frequently linked to acne exacerbation<sup>17</sup>. The androgenic properties of some progestins in these methods appear to stimulate sebaceous glands, leading to increased acne severity<sup>17</sup>. Reports from clinical studies have identified a subset of patients who develop worsening acne following the initiation of progestin-only long-acting reversible contraceptives, although this side effect does not consistently lead to discontinuation of use<sup>17</sup>. This underscores that while acne may be a significant concern for some users, it is not universally perceived as a deciding factor in contraceptive selection<sup>18</sup>. The type of progestin in hormonal contraceptives plays a pivotal role in determining their dermatological impact<sup>18</sup>. Progestins with low androgenic activity, such as desogestrel and norgestimate, are associated with lower risks of acne exacerbation and may even contribute to improvement in acne symptoms<sup>18</sup>. In contrast, progestins with higher androgenic potential are more likely to aggravate acne<sup>18</sup>. These findings emphasize the importance of tailored contraceptive selection to optimize dermatological outcomes, especially for patients predisposed to acne or those with a history of acneiform eruptions<sup>19</sup>.

The impact of hormonal IUDs on sebaceous gland activity has been substantiated through studies demonstrating increased sebum production in users compared to non-users<sup>19</sup>. This heightened sebaceous gland stimulation, attributed to the androgenic effects of progestins, creates an environment conducive to acne formation<sup>19</sup>. Additionally, hormonal fluctuations caused by IUDs may exacerbate inflammatory responses within the skin, further contributing to the development and persistence of acne lesions<sup>19</sup>. While these effects vary among individuals, patients with a predisposition to androgenic sensitivity may be particularly vulnerable<sup>20</sup>. The benefits of low-androgen progestins in managing acne have been well-documented in clinical research<sup>20</sup>. By minimizing sebaceous gland stimulation, these progestins reduce the severity and frequency of acne outbreaks, especially in patients with a history of hormonally driven dermatological conditions<sup>20</sup>. Furthermore, contraceptives containing antiandrogenic agents, such as drospirenone or cyproterone acetate, have shown additional efficacy in mitigating acne symptoms<sup>20</sup>. This highlights the therapeutic potential of careful contraceptive selection in addressing both contraceptive and dermatological needs<sup>21</sup>.

Randomized controlled trials (RCTs) have consistently demonstrated that combined hormonal contraceptives (CHCs) are more effective than hormonal IUDs in reducing acne<sup>21</sup>. These trials highlight the significance of estrogen's antagonistic effects on androgens, which help regulate sebaceous gland activity and decrease the formation of comedones<sup>21</sup>. Furthermore, the inflammatory component of acne appears to be better controlled in patients using CHCs due to their systemic modulation of hormonal levels<sup>21</sup>. These findings suggest that for patients primarily concerned with acne, CHCs may represent a more favorable contraceptive choice



compared to progestin-only options<sup>22</sup>. The relationship between hormonal contraceptive use and acne in patients with polycystic ovary syndrome (PCOS) offers additional insights<sup>22</sup>. In this population, hyperandrogenism exacerbates acne severity, making hormonal regulation crucial for symptom control<sup>22</sup>. CHCs containing low-androgen or antiandrogenic progestins have shown significant efficacy in reducing acne severity in PCOS patients, as they address the underlying hormonal dysregulation<sup>22</sup>. Hormonal IUDs, however, may not provide the same dermatological benefits, potentially worsening acne symptoms in this subset of patients<sup>23</sup>.

Long-term studies on contraceptive use have revealed important considerations regarding acne management and patient satisfaction<sup>23</sup>. Discontinuation of hormonal IUDs often leads to a temporary worsening of acne symptoms as hormonal levels adjust, further complicating treatment outcomes<sup>23</sup>. Moreover, the psychological impact of persistent or severe acne on quality of life highlights the need for integrated dermatological and gynecological care in patients using hormonal contraceptives<sup>23</sup>. Addressing these challenges through personalized treatment plans can significantly improve both dermatological and reproductive health outcomes<sup>24</sup>.

## CONCLUSION

Hormonal contraceptives, particularly hormonal intrauterine devices (IUDs), exhibit varied effects on acne depending on their formulation and hormonal composition. Progestin-only contraceptives, including hormonal IUDs, are associated with an increased risk of acne exacerbation due to their androgenic activity, which stimulates sebaceous gland activity and sebum production. In contrast, combined hormonal contraceptives (CHCs) containing estrogen and low-androgen progestins provide superior benefits in mitigating

acne symptoms by counteracting androgenic effects and reducing inflammatory lesions. The selection of contraceptives should be tailored to individual patient needs, with careful consideration of their dermatological and hormonal profiles. Patients with a history of hormonally driven acne or conditions like polycystic ovary syndrome (PCOS) may benefit more from CHCs containing antiandrogenic progestins such as drospirenone or cyproterone acetate. For these patients, hormonal IUDs may not be the optimal choice due to their potential to worsen acne symptoms.

Clinical evidence from randomized controlled trials highlights the importance of estrogen in managing acne. The systemic regulation of hormonal levels provided by CHCs effectively reduces both comedonal and inflammatory acne. Conversely, the androgenic properties of progestin-only contraceptives present a challenge for patients predisposed to acne, making their use less favorable in such scenarios. Long-term management of acne in patients using hormonal contraceptives requires a multidisciplinary approach. Dermatological and gynecological care should be integrated to optimize outcomes, ensuring that both contraceptive efficacy and skin health are prioritized. Patients should be counseled about potential dermatological side effects of contraceptives and informed of alternative options to mitigate acne.

Discontinuation of hormonal IUDs can result in transient hormonal imbalances and subsequent acne flare-ups, which may affect patient satisfaction. This underscores the need for personalized contraceptive counseling, emphasizing the benefits and limitations of each method to align with patient expectations and medical needs. Addressing the psychological and quality-of-life implications of acne is equally crucial in managing these patients. Future research should focus on optimizing contraceptive formulations to

minimize dermatological side effects while maintaining contraceptive efficacy. Studies exploring the role of antiandrogenic progestins in long-acting reversible contraceptives, as well as their impact on hormonal and der-

matological health, could offer valuable insights. Such advancements will further enhance personalized care and improve outcomes for patients using hormonal contraceptives.

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