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REVIEW

Endometrial Changes Associated with Mifepristone: A Review

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Abstract: Mifepristone is a well-established pharmaceutical agent in obstetrics and gynecology, which has expanded its therapeutic applications to Cushing's syndrome, meningioma, and even mental disease. The incidence of progesterone receptor modulator-associated endometrial changes (PAECs), characterized by cystic glandular dilatation and architectural complexity that mimic endometrial hyperplasia or carcinoma, is increasing. The precise molecular mechanisms remain incompletely understood. Hormonal influences may be central to PAECs pathogenesis. Histological heterogeneity has been observed between ectopic versus eutopic endometrium. The use of mifepristone at low doses (≤10 mg/d) in young women during the early follicular phase appears to be safe. Monitoring of estradiol(E_2) levels before the management is recommended. Risk assessment and preventive strategies, such as intermittent treatment, transvaginal ultrasound and levonorgestrel intrauterine system (LNG-IUS), should be considered.

Keywords: mifepristone, endometrial changes, progesterone receptor modulator-associated endometrial changes (PAECs), endometrial carcinoma, endometrial hyperplasia

Introduction

Mifepristone, a progesterone receptor (PR) antagonist, is widely utilized in gynecological practice for medical termination of early pregnancy and management of conditions such as uterine fibroids and endometriosis. In addition, combined with methotrexate, it can improve the ectopic pregnancy outcome which is explored in depth.[1,2] In recent years, its therapeutic scope has extended to treat Cushing's syndrome, meningioma, mental illness (eg post-traumatic stress disorder, bipolar disorder) and other diseases, often necessitating doses exceeding the conventional range.[3–5] While the drug is generally well-tolerated, its side effects listed in the drug's instructions include mild nausea, vomiting, dizziness, abdominal pain, and uterine bleeding. Of particular clinical concern is the emerging evidence of endometrial thickening associated with mifepristone use. Although historically considered a rare complication, this phenomenon has been increasingly reported in the context of its expanded applications. The potential for endometrial thickening to mimic malignancy underscores the need for vigilant surveillance and accurate differential diagnosis to distinguish it from endometrial cancer. Despite growing clinical awareness, the underlying mechanisms and risk factors remain incomplete. This review aims to synthesize existing evidence, identify critical gaps in the current literature and propose directions for future research in the endometrial effects of mifepristone.

The Effect of Mifepristone on the Endometrium

Mifepristone, a steroid PR antagonist, demonstrates a fivefold higher binding affinity for PR than progesterone (P). Despite its high receptor affinity, mifepristone acts as a pure competitive antagonist, failing to initiate activation and thereby blocking progesterone-mediated signaling. This mechanism effectively inhibits endometrial transition from the proliferative to the secretory phase. Concurrently, mifepristone downregulates endometrial expression of both PR and estrogen receptor (ER), amplifying its anti-transformative effects through dual receptor modulation.[6] Furthermore,

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mifepristone-induced glandular androgen receptor expression enhancement may play a role in the anti-proliferation effect, while the specific mechanism is unclear.[7,8]

Dose-dependent cellular responses to mifepristone have been well-characterized in vitro and vivo. At the endometrial level, escalating doses promote apoptosis, as evidenced by caspase-3 activation.[8–10] Notably, this dose-dependent relationship extends to the hypothalamic-pituitary-ovarian axis (HPOA). Specifically, low-dose regimens primarily affect the pituitary gland, while high-dose administration exerts dual inhibition at both the hypothalamus and pituitary levels, resulting in ovarian suppression.

Current evidence seems to overwhelmingly support mifepristone's dose-dependent endometrial suppression, underpinning its therapeutic utility in conditions like endometriosis and uterine leiomyoma.[11] However, paradoxical cases of endometrial thickening during prolonged use have been reported, occasionally mimicking malignancy on imaging and histopathology.

Complex Biological Effects of Mifepristone on the Endometrium

In 2008, the National Institutes of Health (NIH) introduced the term "progesterone receptor modulator-associated endometrial changes (PAECs)" to describe the heterogeneous endometrial responses observed with mifepristone use.[12] However, some scholars have characterized these changes as exhibiting "estrogen-like" effects for the proliferation effect.[6,7,13]

Extensive research has been conducted to elucidate the correlation between PAECs and mifepristone dosage and duration.[6] For instance, a case series report published in 2005 documented varying degrees of endometrial thickening in patients receiving mifepristone at doses up to 400 mg/d, down to 5 mg/d, over 6 months,[14] in which a large number of gray endometrial carcinoma-like tissues were found in some patients after laparotomy, but the pathological result was simple endometrial hyperplasia. A prospective study, by Fleseriu M et al, involving 35 women with Cushing's syndrome taking mifepristone (300–1200 mg/d) for 24 weeks reported endometrial thickening in 10 patients (28.6%), 3 of them underwent curettage for unresolved endometrial thickening.[3] However, a meta-analysis from 2013, exploring effects of mifepristone on uterine leiomyoma in premenopausal women, indicated a tenuous association between mifepristone doses and endometrial atypical hyperplasia but noted a marked difference in endometrial thickness between mifepristone (2.5mg/d, 5mg/d,10mg/d) and placebo groups, emphasizing the need for rigorous endometrial monitoring during treatment.[15] Carbonell JL et al's clinical researches were included and exhibited good homogeneity.[16–18] The thickness of the endometrium returned to normal 12 months after stopping the mifepristone.[17] Subsequent research, such as a 2016 double-blind controlled trial found no significant differences in the incidence of PAECs after treating endometriosis women with doses of 2.5, 5, or 10 mg/d for 6 months, but the 5 mg/d group exhibited the lowest incidence (9.1%), while the 2.5 mg/d group demonstrated the highest (16.7%).[19] In the same year, a study 36 women with uterine fibroids treated with 50 mg/w of mifepristone for 6 months reported that only 15% maintained normal or atrophic endometrium, with the remainder showing varying degrees of hyperplasia.[20] Collectively, mifepristone doses ≤10 mg/d are generally safe, with 5 mg/d potentially offering the optimal balance between efficacy and safety. Notably, a 2022 clinical report proposed the use of ultra-low dose mifepristone may be considered for patients who do not respond to conventional doses (50 mg/d), particularly perimenopause women with uterine fibroids.[21] High-dose mifepristone is rarely used in gynecological practice, with its primary applications limited to short-term management of conditions such as meningioma or Cushing's disease. In such cases, intermittent short-course progestin treatment may prove advantageous particularly when the anti-PRs effects of mifepristone are not the primary therapeutic goal.[22]

A significant shortcoming of the existing studies is the lack of comprehensive analysis of hormone levels before, during, and after mifepristone administration. While some studies stratified patients based on menstrual cycle timing, others provided insufficient hormonal data.[19,23] In clinical practice, mifepristone is typically initiated within 7 days of menstrual onset, but the situation that taking the drug at the onset of symptoms cannot be ruled out, complicating the assessment of whether baseline hormonal levels influence PAECs development. This gap underscores the need for systematic studies to clarify the role of hormone status in PAECs pathogenesis.

However, a 120-day double-blind randomized controlled trial by Brown A et al in 2002 revealed that healthy women in Edinburgh who initiated mifepristone during the middle of the menstrual cycle or luteal phase exhibited endometrial thickening and divergent E_2 trends, regardless of dose (5 mg/d or 2 mg/d). In contrast, healthy women in Shanghai who

started treatment during the early follicular phase showed endometrial thinning and a decline in E_2 level, with a positive correlation.[24] These findings suggest that the pre-treatment E_2 level, alongside such as race, steroids, and diet, may influence PAECs development.

A 2018 clinical trial highlighted that PAECs are more prevalent in older women, potentially due to the decline in P production that occurs after menopause. The study also identified a strong correlation between Ki67 expression (a marker of cellular proliferation) and the severity of PAECs pathology.[25]

While multiple factors contribute to PAECs development, hormonal influences appear to play a central role which future research should prioritize.

PAECs

It is used to describe specific histological alterations observed in the endometrium of patients undergoing long-term treatment with PR antagonists. These changes are characterized by benign, non-physiological, and non-proliferative features. Importantly, PAECs are reversible, with histological normalization typically occurring following discontinuation of PR antagonist therapy.[26,27] The specific histological manifestations of PAECs may vary depending on the pharmacological agent used, as well as factors such as dose, duration of treatment, and individual patient characteristics.

Changes in Eutopic Endometrium

Macroscopically, ultrasound examinations reveal increased endometrial thickness in patients receiving long-term mifepristone therapy. Histologically, endometrial biopsies demonstrate cystic glandular dilatation without atypical cells, initially suggestive of "simple hyperplasia". However, further examination often reveals secretory changes and other features inconsistent with hyperplasia. Currently, PAECs are characterized by: cystic hyperplasia accompanied by secretory changes; non-synchronous alterations in interstitial and glandular tissue (ie increased mitosis, multiple fibrosis, and "chicken foot" vascular patterns without thrombosis in the interstitial; a combination of mitosis, altered secretion, apoptosis and inactivity in the gland).[27]

These findings suggest that mifepristone disrupts the typical overlapping hormonal dynamics of E and P, potentially leading to simultaneous E and P stimulation within individual glans. However, the precise mechanism underlying these changes remains unclear.[27]

Studies investigating the distribution of PR and estrogen receptor (ER) following mifepristone treatment have reported variable patterns depending on treatment periods or menstrual cycle phase. For example, a trial administering 50 mg/d of mifepristone during the early follicular phase for 6 months found significantly increased ER levels in the endometrial stroma, with no significant changes in the interstitial PR or glandular ER/PR levels between the groups.[28] When administered during the luteal phase, non-synchronous phenomena persisted, but findings on PR immunostaining were inconsistent. Some studies reported a decline in PR levels,[29] while others observed an increase.[30] These discrepancies may reflect differences in study design, including dose and timing of administration.

Notably, a 2002 study demonstrated that mifepristone reduces E_2 levels while increasing ER expression, which is highly sensitive to E2.[13] In the early follicular phase, where E_2 predominates, reduced E_2 levels result in endometrial thinning. Conversely, in the luteal phase, where P dominates, decreased E_2 levels may impair the P effect which is based on E_2, leading to endometrial thickening. These findings suggest that initiating mifepristone during the early follicular phase, with careful consideration of the ovarian cycle phase and E_2 levels, may mitigate endometrial changes and enhance safety.

While hormonal influences may be central to PAECs pathogenesis, additional mechanisms may contribute to endometrial changes. For instance, cytokines may directly affect glandular mitosis, potentially reducing proliferative activity. Further research is needed to elucidate these pathways and their clinical implications.

Despite concerns regarding mifepristone's endometrial effects, the literature indicates a low incidence of atypical hyperplasia or endometrial cancer.[12] In a study of 11 Chinese women with long-term mifepristone exposure published in 2022, only one endometrial cancer was reported, characterized by stromal infiltration but low Ki67 expression and absent mitosis.[11] In 2018, a study found that mifepristone downregulates *HAND* and upregulates fibroblast growth factor 18 (FGF18), which is associated with endometrial thickening and endometrial cancer. In contrast, ulipristal acetate (UPA), another PR antagonist, did not exhibit these effects.[31] In the same year, the molecular expression of PAECs was subjected

to intensive investigation, which suggested that PAECs upregulate three genes (*THY1, ADAM12, TN-C*) that do not participate in the endometrial cancer signaling pathway.[32] Instead, these genes appear to alter the tissue structure, thereby providing further evidence that mifepristone is safe. It has been suggested that the placement of a levonorgestrel intrauterine system (LNG-IUS) after two months may address the safety concerns.[33] However, it should be noted that the indications for LNG-IUS do have some overlap with those for mifepristone.

Mifepristone is not an entirely safe option when the duration is long or the dosage is large. Therefore, it should be considered only when a superior agent is unavailable. Increased endometrial thickness monitoring is necessary if patients must take mifepristone for a long duration (≥3 months). Initial monitoring begins during the first 3 months,[34–36] and the following monitoring time may be suitably extended based on specific circumstances. The discontinuation of mifepristone can improve endometrial thickness.[27,37] Patients with endometrial thickness who experience symptoms like bleeding (thickness usually >8 mm, even over 20 mm) or perimenopause are advised to undergo curettage.[17,38,39] LNG-IUS can be employed as an emergency measure or succedaneum.[33]

Changes in Ectopic Endometrium

Historically, research on mifepristone-induced endometrial changes has primarily focused on the eutopic endometrium, with limited attention given to the ectopic endometrium. However, a recent study demonstrated that the ectopic endometrium in ovarian lesions of the majority of individuals (8 out of 11) displayed histopathological changes similar to those observed in the eutopic endometrium, including inactive glands and mild secretory changes, but the ectopic was characterized by more pronounced glandular congestion and less discernible secretory alternations.[11] This discrepancy can be explained by the distinct biological behaviors exhibited by the two entities. For example, increased expression and activity of 3β-hydroxysteroid dehydrogenase (3β-HSD) in the ectopic enhance the conversion of cholesterol to androstenedione, a precursor for E_2 synthesis. Higher androstenedione levels lead to increased E_2 production. Additionally, ectopic tissue reduced the expression of *CYP11A1*, the enzyme responsible for synthesizing P, and exhibits a deficiency in PR-B and decreased levels of PR-A[12], further impairing progesterone signaling.

Conclusions

In summary, prolonged use of mifepristone is potentially associated with the development of PAECs. Although numerous reports have not documented pathological diagnoses of atypical hyperplasia or endometrial cancer, the molecular mechanisms underlying these endometrial changes remain incompletely understood. Clinically, the use of mifepristone in young women during the early follicular phase at doses of ≤10 mg/d appears to be safe, although monitoring E_2 levels is advisable. However, clinicians should exercise caution when prescribing mifepristone, particularly when more effective therapeutic alternatives are available. In cases where endometrial thickening is detected via ultrasound during or after mifepristone treatment, a thorough differential diagnosis —including endometrial biopsy or curettage —is essential to rule out atypical hyperplasia or malignancy, especially for patients with bleeding symptoms or the perimenopausal period. Appropriate follow-up treatment should be considered, such as LNG-IUS, rather than resorting to hysterectomy due to suspicion of malignancy.

Despite the development of numerous novel pharmaceutical agents with the potential to replace mifepristone, it remains a cornerstone in research as a foundational PR antagonist. Critical research gaps persist, including a deeper understanding of population-specific variations in PAECs and the development of precision administration strategies to minimize the risk of PAECs while maximizing therapeutic efficacy. Addressing these gaps will require rigorous randomized controlled trials (RCTs) with large, diverse cohorts and long-term follow-up.

Disclosure

The authors have no conflicts of interest.

References

1. Dealberti D, Franzò S, Bosoni D, et al. The use of methotrexate and mifepristone for treatment of interstitial pregnancies: an overview of effectiveness and complications. *J Clin Med*. 2023;12(23):7396. doi:10.3390/jcm12237396
2. Stabile G, Romano F, Zinicola G, et al. Interstitial ectopic pregnancy: the role of mifepristone in the medical treatment. *Inter J Environ Res Public Health*. 2021;18(18):9781. doi:10.3390/ijerph18189781
3. Fleseriu M, Biller BM, Findling JW, Molitch ME, Schteingart DE, Gross C. Mifepristone, a glucocorticoid receptor antagonist, produces clinical and metabolic benefits in patients with Cushing's syndrome. *J Clin Endocrinol Metab*. 2012;97(6):2039–2049. doi:10.1210/jc.2011-3350
4. Mathew S, Ticsa MS, Qadir S, Rezene A, Khanna D. Multiple clinical indications of mifepristone: a systematic review. *Cureus*. 2023;15(11): e48372. doi:10.7759/cureus.48372
5. Golier JA, Li X, Bizien M, et al. Efficacy and safety of mifepristone in the treatment of male US veterans with posttraumatic stress disorder: a phase 2a randomized clinical trial. *JAMA Network Open*. 2023;6(5):e2310223. doi:10.1001/jamanetworkopen.2023.10223
6. Zhang Y, Hui N. Research progress of mifeprinstone on endometrium China medical Herald. 2012;9(02):16–18.
7. Yi M. *The Effects of Mifepristone on Human Endometrial Cellsand Its Mechanism*. Master: Second Military Medical University; 2018.
8. Singh P, Sharma RK. Changes in surface morphology, lectin staining, and gene expression of caprine endometrium exposed to estradiol, progesterone, and mifepristone in vitro. *Iranian J Veterinar Res*. 2022;23(1):61–68. doi:10.22099/IJVR.2021.41508.6036
9. Wang Y, Jiang X, Wang S. The influence of mifepristone to caspase 3 expression in adenomyosis. *Clin Exper Obstet Gynecol*. 2014;41(2):154–157. doi:10.12891/ceog15872014
10. Minhui YYZ, Zhijun J. Effect of mifepristone on expression of angiogenic factors and apoptosis of human endometrial cells. *J Prac Obstet Gynecol*. 2016;32(07):523–527.
11. Pan Y, Wu T, Shi H. Distinct clinicopathological features of ovarian endometriosis after long-term exposure to mifepristone. *J Inter Med Res*. 2022;50(11):3000605221134471. doi:10.1177/03000605221134471
12. Murji A, Whitaker L, Chow TL, Sobel ML. Selective progesterone receptor modulators (SPRMs) for uterine fibroids. *Cochrane Database Syst Rev*. 2017;4(4):Cd010770. doi:10.1002/14651858.CD010770.pub2
13. Baird DT, Brown A, Critchley HO, Williams AR, Lin S, Cheng L. Effect of long-term treatment with low-dose mifepristone on the endometrium. *Human Reprod*. 2003;18(1):61–68. doi:10.1093/humrep/deg022
14. Wu J, Zhang E, Kang A, Wang T, Huang Y, Zhang H. Endometrial dysplasia caused by long-term use of mifepristone (a report of 3 cases and review of the literature. *Progress Obstet Gynecol*. 2005;(01):72–73.
15. Shen Q, Hua Y, Jiang W, Zhang W, Chen M, Zhu X. Effects of mifepristone on uterine leiomyoma in premenopausal women: a meta-analysis. *Fertil Steril*. 2013;100(6):1722–6.e1–10. doi:10.1016/j.fertnstert.2013.08.039
16. Carbonell JL, Acosta R, Pérez Y, et al. Safety and effectiveness of different dosage of mifepristone for the treatment of uterine fibroids: a double-blind randomized clinical trial. *Int J Women's Health*. 2013;5:115–124. doi:10.2147/IJWH.S33125
17. Esteve JL, Acosta R, Pérez Y, Campos R, Hernández AV, Texidó CS. Treatment of uterine myoma with 5 or 10mg mifepristone daily during 6 months, post-treatment evolution over 12 months: double-blind randomised clinical trial. *Eur J Obstet Gynecol Reprod Biol*. 2012;161(2):202–208. doi:10.1016/j.ejogrb.2011.12.018
18. Carbonell Esteve JL, Riverón AM, Cano M, et al. Mifepristone 2.5 mg versus 5 mg daily in the treatment of leiomyoma before surgery. *Int J Women's Health*. 2012;4:75–84. doi:10.2147/IJWH.S28103
19. Carbonell JL, Riverón AM, Leonard Y, et al. Mifepristone 2.5, 5, 10 mg versus placebo in the treatment of endometriosis. *Assessment*. 2016;24 (2):232–243. doi:10.1177/1073191115605631
20. Kapur A, Angomchanu R, Dey M. Efficacy of use of long-term, low-dose mifepristone for the treatment of fibroids. *J Obstet Gynaecol India*. 2016;66(Suppl 1):494–498. doi:10.1007/s13224-016-0861-7
21. Zhou G, Li Q. Long-term use of ultra-low-dose mifepristone for uterine leiomyoma control and safety discussion: a case report. *Medicine*. 2022;101(52):e32413. doi:10.1097/MD.0000000000032413
22. Newfield RS, Spitz IM, Isacson C, MI N. Long-term mifepristone (RU486) therapy resulting in massive benign endometrial hyperplasia. *Clin Endocrinol*. 2001;54(3):399–404. doi:10.1046/j.1365-2265.2001.01026.x
23. Wang X, Luan Q. Study on the influence of low-dose mifepristone in uterine endometrium. *J Guide China Med*. 2012;10(29):45–47.
24. Brown A, Cheng L, Lin S, Baird DT. Daily low-dose mifepristone has contraceptive potential by suppressing ovulation and menstruation: a double-blind randomized control trial of 2 and 5 mg per day for 120 days. *J Clin Endocrinol Metab*. 2002;87(1):63–70. doi:10.1210/jcem.87.1.8140
25. Pleş L, Sima RM, Carp D, Florescu C, Dimitriu MCT, Ionescu CA. UPA effects on endometrium - what is the significance? *Rom J Morphol Embryol*. 2018;59(4):1127–1132.
26. Dinh A, Sriprasert I, Williams AR, Archer DF. A review of the endometrial histologic effects of progestins and progesterone receptor modulators in reproductive age women. *Contraception*. 2015;91(5):360–367. doi:10.1016/j.contraception.2015.01.008
27. Mutter GL, Bergeron C, Deligdisch L, et al. The spectrum of endometrial pathology induced by progesterone receptor modulators. *Mod Pathol*. 2008;21(5):591–598. doi:10.1038/modpathol.2008.19
28. Murphy AA, Michael KL, Morales AJ, Roberts V, Parmley T, Yen SSC. Endometrial effects of long-term low-dose administration of RU486**supported by san diego reproductive medicine educational and research foundation, San Diego, California and the Andrew W. Mellon foundation, New York, New York.††presented in part at the 48th annual meeting of society of gynecologic investigation, Toronto, Ontario, Canada, March 31 to April 3, 1993. *Fertility and Sterility*. 1995;63(4):761–766.
29. Greene KE, Kettel LM, Yen SS. Interruption of endometrial maturation without hormonal changes by an antiprogesterone during the first half of luteal phase of the menstrual cycle: a contraceptive potential. *Fertil Steril*. 1992;58(2):338–343. doi:10.1016/S0015-0282(16)55200-5
30. Chen Y, Wang W, Zhuang Y, Chen X, Huang L. Effects of low-dose mifepristone administration in two different 14-day regimens on the menstrual cycle and endometrial development: a randomized controlled trial. *Contraception*. 2011;84(1):64–70. doi:10.1016/j.contraception.2010.12.001
31. Kannan A, Bhurke A, Sitruk-Ware R, et al. Characterization of molecular changes in endometrium associated with chronic use of progesterone receptor modulators: ulipristal acetate versus mifepristone. *Reprod Sci*. 2018;25(3):320–328. doi:10.1177/1933719117746764
32. Berger C, Boggavarapu N, Norlin E, et al. Molecular characterization of PRM-associated endometrial changes, PAEC, following mifepristone treatment. *Contraception*. 2018;98(4):317–322. doi:10.1016/j.contraception.2018.05.020

33. Papaikonomou K, Frisendahl C, Williams ARW, Gemzell-Danielsson K. Effects of the levonorgestrel intrauterine system on the endometrium after long-term exposure to mifepristone: secondary outcomes of a randomized controlled trial. *Eur J Obstet Gynecol Reprod Biol*. 2020;252:330–335. doi:10.1016/j.ejogrb.2020.06.056
34. Kulshrestha V, Kriplani A, Agarwal N, et al. Low dose mifepristone in medical management of uterine leiomyoma - an experience from a tertiary care hospital from north India. *Indian J Med Res*. 2013;137(6):1154–1162.
35. Wagh G. An expert consensus on the medical management of uterine fibroids and complementing surgical management with focus on low dose mifepristone. *Inter J Clin Obstet Gynaecol*. 2024.
36. Lal R, Ashwini A, Lal S. Role of low dose mifepristone in the treatment of symptomatic fibroid uterus: a double control randomized control trial. *J Evolution of Med Dent Sci*. 2015;4(57):9990–10000. doi:10.14260/jemds/2015/1444
37. Carbonell JL, Acosta R, Pérez Y, Garcés R, Sánchez C, Tomasi GJHPC. Treatment of uterine myoma with 2.5 or 5 mg mifepristone daily during 3 months with 9 months posttreatment followup: randomized clinical trial. *ISRN Obstetrics and Gynecology*. 2013;2013:1–8. doi:10.1155/2013/649030
38. Morrison J, Balega J, Buckley L, et al. British gynaecological cancer society (BGCS) uterine cancer guidelines: recommendations for practice. *Eur J Obstet Gynecol Reprod Biol*. 2022;270:50–89. doi:10.1016/j.ejogrb.2021.11.423
39. Vikram SR, Robinson J, Thanawala T, et al. Ultrasound and blind endometrial sampling for detection of endometrial cancer in women with postmenopausal bleeding. *Cochrane Database Syst Rev*. 2024;6(6):Cd014568. doi:10.1002/14651858.CD014568