

CERVICAL EROSION THROUGH THE LENS OF CONTEMPORARY MEDICINE AND
AYURVEDIC PRINCIPLES: A COMPARATIVE ANALYSIS OF PATHOPHYSIOLOGYDr. Lavanya S.*¹, Dr. Anupama V.²¹PhD Scholar, Department of PTSR, Sri Kalabyraveshwara Swamy Ayurvedic Medical College, Hospital & Research Center, Bengaluru.²Professor & HOD, Department of PTSR, Sri Kalabyraveshwara Swamy Ayurvedic Medical College, Hospital & Research Center, Bengaluru.

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Center, Bengaluru.<https://doi.org/10.5281/zenodo.18161477>**How to cite this Article:** Dr. Lavanya S.*, Dr. Anupama V. (2026). Cervical Erosion Through The Lens Of Contemporary Medicine And Ayurvedic Principles: A Comparative Analysis Of Pathophysiology. International Journal of Modern Pharmaceutical Research, 10(1), 86–90.**ABSTRACT**

Cervical erosion, clinically referred to as cervical ectropion, is a prevalent gynaecological condition characterized by the eversion of columnar epithelium from the endocervical canal onto the ectocervical surface, replacing the native stratified squamous epithelium. Although frequently asymptomatic, it may manifest with persistent vaginal discharge, post-coital bleeding, pelvic discomfort, or increased susceptibility to infections. In contemporary medicine, cervical erosion is understood as a benign or reactive phenomenon, typically resulting from hormonal fluctuations, chronic inflammation, or mechanical trauma, particularly during reproductive years. Conversely, Ayurveda, the ancient Indian system of holistic medicine, interprets this condition through the conceptual framework of Garbhashaya Grivamukha Vrana, which are indicative of doshic imbalance—primarily involving Pitta and Kapha—and pathological disruption in dhatu (tissues) and srotas (channels). The manifestation is seen as a localized expression of systemic derangement, often associated with improper lifestyle (vihara), unwholesome diet (ahara), and suppressed natural urges (vegadharana). This article presents a comprehensive comparative review of the pathophysiological perspectives of cervical erosion in both modern biomedical science and classical Ayurvedic literature. By juxtaposing the cellular, immunological, and endocrine understanding of modern gynaecology with the dosha-dhatu-srotas theory of Ayurveda, this analysis aims to deepen clinical insight and encourage integrative diagnostic and therapeutic approaches. Such a perspective not only fosters cross-disciplinary understanding but also supports individualized, patient-centric care rooted in both evidence-based medicine and traditional healing systems.

KEYWORDS: Cervical erosion, cervical ectropion, Garbhashaya Grivamukha Vrana, Yoni Vyapad, srotodushti, hormonal influence, cervical inflammation.**INTRODUCTION**

Cervical erosion, though frequently asymptomatic, may present with clinical features such as persistent vaginal discharge, post-coital bleeding, dyspareunia, and an increased risk of ascending genital tract infections, thereby affecting both the reproductive health and overall quality of life in affected women. The global prevalence of this condition is estimated to range between 17% and 50%, depending on the population studied and diagnostic methods employed.^[1] In India, epidemiological surveys conducted in rural settings report a prevalence of approximately 36% among symptomatic women, particularly those presenting with chronic leucorrhea or cervicitis.^[2] Recognized risk factors include hormonal fluctuations, multiparity, inadequate genital hygiene, recurrent genital infections, and prolonged use of

hormonal contraceptives.^[3] If neglected, cervical erosion may progress to chronic cervicitis, cervical stenosis, alterations in cervical mucus that impair sperm migration, and a higher susceptibility to HPV infection, which may increase the risk of cervical intraepithelial neoplasia (CIN) and cervical dysplasia.^[4,5]

In the Ayurvedic system of medicine, this condition can be conceptually aligned with Yoni Vyapad (disorders of the female reproductive tract), particularly Garbhashaya Grivamukha Vrana and Yoni Vrana, which share symptomatic parallels such as Yoni Srava (abnormal vaginal discharge), Daha (burning sensation), and Vedana (pain or discomfort). The underlying pathogenesis (Samprapti) is understood as resulting from vitiation of Pitta and Kapha doshas, which disturb the

local tissue environment, lead to Dhatu Kshaya (depletion of Rakta and Mamsa Dhatus), and obstruct the Artavavaha and Rajovaha Srotas—channels responsible for menstrual and reproductive function.^[6,7] This integrative understanding provides a broader framework for clinical evaluation, allowing both symptomatic relief and systemic correction through holistic principles.

Pathophysiology in Contemporary Medicine (Expanded)

Cervical erosion, medically termed cervical ectropion, is characterized by the eversion or outward displacement of the mucus-secreting columnar epithelium from the endocervical canal onto the ectocervical surface. This process is largely estrogen-dependent and is physiologically common during adolescence, pregnancy, and in women using combined oral contraceptives.^[8] Estrogen promotes hypertrophy and hyperplasia of columnar epithelium and increases cervical vascularity, facilitating the transformation zone to migrate outward.

Unlike the native stratified squamous epithelium of the ectocervix, the exposed columnar epithelium is delicate and non-keratinized, lacking protective features like tight intercellular junctions and superficial dead cell layers. This makes it highly susceptible to chemical irritation, frictional trauma (e.g., during intercourse), changes in vaginal pH, and microbial colonization, particularly by *Candida*, *Trichomonas*, and bacterial vaginosis-associated flora.^[9]

Additionally, the acidic vaginal milieu causes degeneration and desquamation of the columnar cells, which may trigger a reparative response leading to squamous metaplasia—a physiologic but sometimes dysregulated process. This dynamic cellular turnover occurs in the transformation zone, a known site for the initiation of cervical dysplasia and carcinogenesis, particularly in the presence of persistent HPV infection.^[10]

Cellular and Histopathological Changes

1. Columnar Cell Eversion: The exposed columnar cells actively secrete mucus and are fragile in nature, leading to surface erosion, ulceration, and chronic mucosal irritation.

2. Squamous Metaplasia: This adaptive mechanism involves transformation of undifferentiated basal reserve cells into squamous epithelium. Although protective, it also makes the cervix more vulnerable to HPV invasion due to basal cell exposure.^[11]

3. Chronic Inflammatory Infiltration: Histologically, cervical erosion reveals dense subepithelial infiltrates of lymphocytes, plasma cells, and macrophages, reflecting the chronic immune response to ongoing irritation.

4. Stromal Edema and Vascular Congestion: Persistent inflammation increases capillary permeability, leading to tissue edema, engorgement, and fragility of cervical vessels, often manifesting as contact bleeding.

5. Glandular Hyperplasia: As a reactive process, endocervical glands become enlarged and increased in number, contributing to excessive mucus production and mucoid discharge.

6. Disruption of Tight Junctions: Chronic inflammation impairs epithelial tight junction integrity, facilitating microbial translocation and amplifying local cytokine responses, further damaging cervical tissue.^[12]

Immunopathological Mechanisms

- Pro-inflammatory cytokines like IL-6, TNF- α , and IL-1 β stimulate leukocyte infiltration and angiogenesis, while PGE2 mediates vascular dilation and edema formation.
- Matrix Metalloproteinases (MMPs)—particularly MMP-2 and MMP-9—are released by neutrophils and stromal cells, promoting degradation of the basement membrane and extracellular matrix, resulting in tissue remodeling and further erosion.^[13]
- VEGF (vascular endothelial growth factor) and nitric oxide (NO) upregulation promote neoangiogenesis, contributing to cervical hyperemia and susceptibility to contact bleeding.
- HPV entry is facilitated in areas of squamous metaplasia, where basal cells—targets for high-risk HPV types—are directly exposed. The chronic inflammatory environment suppresses local mucosal immunity, enabling HPV persistence and transformation.^[14]

Complications

If left unmanaged, cervical erosion can predispose to

- Chronic Cervicitis: Long-standing inflammation damages epithelial integrity and allows recurrent microbial colonization, contributing to persistent discharge and discomfort.
- Cervical Stenosis: Healing with fibrosis after repeated epithelial disruption or ablative procedures can lead to narrowing of the cervical canal, causing dysmenorrhea, infertility, or obstructed menstrual flow.
- Infertility: Erosion affects the quality and pH of cervical mucus, hindering sperm motility and migration, particularly during ovulation.^[15]
- HPV Persistence and CIN: Disruption in epithelial differentiation and immune surveillance allows for high-risk HPV integration, a key event in the development of cervical intraepithelial neoplasia (CIN) and eventually invasive cervical carcinoma, especially in high-risk populations.^[16]

Ayurvedic Pathophysiology of Cervical Erosion (Garbhashaya Grivamukha Vrana)

In Ayurveda, cervical erosion is best understood within the framework of **Yoni Vyapad**—a group of disorders affecting the female reproductive system. Among these, conditions like **Yoni Vrana** (ulceration or wounds of the vaginal and cervical canal) and **Garbhashaya Grivamukha Vrana** (ulcer at the cervical mouth of the

uterus) are closely analogous to cervical ectropion described in modern medicine.

1. Nidana (Etiological Factors)

Classical Ayurvedic texts attribute cervical disorders to a wide range of causative factors:

- **Ahita Ahara** (unwholesome diet): Excessive intake of spicy, sour, fermented foods increases Pitta and impairs Rakta and Mamsa Dhatus.
- **Ahita Vihara** (inappropriate lifestyle): Daytime sleeping, excessive exertion, suppression of natural urges (Vega Dharana), and stress affect Vata and Pitta balance.
- **Maithuna Atiyoga** (excessive or forceful sexual activity): Leads to trauma and local Pitta aggravation, promoting ulceration.
- **Menstrual irregularities**: Irregular, heavy, or painful periods suggest Srotodushti in Artavavaha Srotas.

Ref: Charaka Samhita, Chikitsa Sthana 30/21–25; Sushruta Samhita, Nidana Sthana 13

2. Dosh-Dushya Sammurchana (Interaction of Vitiated Doshas with Tissues)

- **Pitta Dosh**: Dominates in inflammatory conditions. Its ushna (heat) and tikshna (penetrative) qualities lead to burning, ulceration, and bleeding.
- **Kapha Dosh**: Involved in mucosal overgrowth, excessive discharges, and delayed healing due to its snigdha (unctuous) and manda (slow) nature.
- **Vata Dosh**: When aggravated (especially Apana Vata), contributes to pain, tissue dryness, and chronicity.

Affected Dhatus (tissues)

- **Rakta Dhatu**: Shows signs of inflammation, bleeding, and erythema.
- **Mamsa Dhatu**: Degeneration and ulceration of the cervical tissue.

5. Clinical Presentation (Lakshana)

6. Chronicity and Recurrence

Ayurvedic Symptom	Modern Correlation
Yoni Srava	Vaginal discharge
Daha	Burning sensation
Vedana	Pain or discomfort
Raktasrava	Post-coital or spontaneous bleeding
Vaivaranya	Erythematous or reddish cervical tissue

According to Ayurveda, if not addressed systemically, local treatment may offer only temporary relief. A continued imbalance of doshas, especially in **Pitta-Kapha Prakriti** individuals, can lead to frequent recurrences. Weak **Ojas** (vital essence) and impaired **Agni** (digestive/metabolic fire) worsen prognosis by reducing dhatu strength and immune resilience.

Ref: Ashtanga Hridaya, Uttara Tantra 38; Charaka Samhita, Sutra Sthana 15

- **Shukra Dhatu**: In chronic stages, reproductive capacity may be compromised.

Ref: Ashtanga Hridaya, Sharira Sthana 3; Sushruta Samhita, Sharira Sthana 9

3. Srotodushti (Channel Impairment)

Cervical erosion reflects disturbances in the **Artavavaha Srotas** (channels responsible for menstruation and reproductive fluid), and secondarily, **Rasavaha** and **Raktavaha Srotas**.

Types of Srotodushti involved

- **Atipravritti**: Excessive secretion (e.g., white discharge)
- **Sanga**: Obstruction leading to chronic inflammation or fibrosis
- **Vimargagamana**: Abnormal flow, such as contact bleeding
- **Siragranthi**: Engorgement of blood vessels

Ref: Charaka Samhita, Vimana Sthana 5/3; Sushruta Samhita, Nidana Sthana 13

4. Samprapti (Pathogenesis)

A simplified step-wise Ayurvedic pathogenesis of cervical erosion

1. Nidanans (causative factors) vitiate Pitta and Kapha doshas.
2. These doshas accumulate in the **Garbhashaya Grivamukha Pradesha** (cervical region).
3. Vitiated doshas cause inflammation, discharge, and ulceration by damaging Rakta and Mamsa Dhatus.
4. Srotas become blocked or dysfunctional, impairing local immunity and nutrient flow.
5. Chronicity results in Vrana (ulcer), sometimes complicated by Krimija involvement (microbial infection).

Ref: Bhavaprakasha, Madhyama Khanda – Yoni Vyapad Prakarana

DISCUSSION (Comparative Perspective with References)

Cervical erosion, or **cervical ectropion**, is recognized in contemporary gynecology as a physiological or reactive condition where the **columnar epithelium of the endocervix** extends onto the ectocervix under the influence of estrogen, especially during **puberty, pregnancy, or hormonal contraceptive use**.^[1,2] While typically asymptomatic, it can lead to chronic mucosal irritation, discharge, and susceptibility to infections like

Candida, Trichomonas, and HPV.^[3,4] Histological features include **squamous metaplasia, stromal edema, inflammatory infiltrates, and disruption of the epithelial barrier**, which further exacerbates microbial entry and chronic cervicitis.^[5,6]

From an **Ayurvedic viewpoint**, cervical erosion is conceptually correlated with **Garbhashaya Grivamukha Vrana**, falling under the larger group of

Yoni Vyapad. Here, the **Samprapti (pathogenesis)** is traced to the **vitiating of Pitta and Kapha doshas**, which act upon **Rakta and Mamsa Dhatus**, leading to Vrana (ulceration), excessive discharge (**Yoni Srava**), and inflammation (**Daha**).^[7,8] The disruption in **Artavavaha and Raktavaha Srotas** explains altered menstrual flow, infertility, and local immune dysfunction.

Comparative Table: Pathophysiological Insights

Aspect	Modern Medicine	Ayurveda
Terminology	Cervical erosion / Cervical ectropion	Garbhashaya Grivamukha Vrana / Yoni Vrana
Etiology	Estrogen stimulation, infections, chronic inflammation, mechanical trauma ^[1,2]	Pitta-Kapha vitiation, Maithuna Atiyoga, Vega Dharana, Ahita Ahara-Vihara ^[7,8]
Pathological Process	Columnar eversion, squamous metaplasia, cytokine activity, stromal inflammation ^[5]	Dosha-Dushya Sammurchana, Dhatu Kshaya, Srotodushti ^[7-10]
Symptoms	Discharge, post-coital bleeding, dyspareunia, infertility. ^[3,4]	Yoni Srava, Raktasrava, Vedana, Daha, Vaivarnya ^[8]
Immune Response	IL-6, TNF- α , PGE2, MMPs, impaired tight junctions ^[6]	Weak Ojas, impaired Agni, chronic doshic aggravation ^[10]
Microbial Susceptibility	HPV, Trichomonas, Candida, bacterial vaginosis ^[4,11]	Krimija Vrana (microbial ulceration) ^[9]
Complications	CIN, cervical stenosis, infertility, chronic cervicitis ^[5,11]	Vandhyatva, chronic Vrana, Artava Dushti, Dhatu depletion ^[9,10]
Diagnosis	Colposcopy, Pap smear, histology, HPV typing ^[1,4]	Trividha Pariksha (Darshana, Sparshana, Prashna) ^[7]
Treatment	Antibiotics, hormonal therapy, cryoablation, laser therapy ^[1]	Shodhana, Shamana, Yoni Prakshalana, Rasayana, Pathya-Apathya ^[8-10]

While **modern management** emphasizes precision diagnostics and symptomatic relief, **Ayurveda** provides an individualized understanding that includes lifestyle correction and systemic purification. The Ayurvedic focus on *Ojas*, *Agni*, and *Srotas* highlights the need to treat underlying systemic imbalances to ensure complete healing and recurrence prevention.

CONCLUSION

Cervical erosion is a common yet often underestimated condition with both **local epithelial pathology** and **systemic associations**. **Modern gynecology** provides a well-documented framework for diagnosis, microbiological assessment, and interventional management including cryotherapy and HPV monitoring. However, such therapies may not address the **systemic tendencies toward recurrence** and mucosal fragility in predisposed individuals.^[3,5]

Ayurveda brings depth through its understanding of **doshic imbalance, tissue depletion, and srotas dysfunction**. Management strategies such as **Shodhana (purification), Rasayana (rejuvenation), and Sthanika Chikitsa (local therapies)** offer systemic detoxification, tissue healing, and immunity enhancement, thereby addressing not only the visible lesion but also its underlying root cause.^[8-10]

By **synthesizing both paradigms**, clinicians can develop a **comprehensive, individualized care model** that

combines **objective diagnostics** with **systemic constitutional correction**. Such an integrative approach is particularly beneficial in recurrent, chronic, or HPV-persistent cervical erosion, offering both **curative and preventive** potential.

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