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Chronotherapeutic Herbal Sitz Bath at the Mao Hour (05:00–07:00) for Post-Hemorrhoidectomy Care

Ye Sun[1], Xi Zhang[2,*]

[1]Shaanxi University of Chinese Medicine, Xianyang 712046, Shaanxi, China
[2]Xi'an Affiliated Hospital of Shaanxi University of Chinese Medicine, Xi'an 710021, Shaanxi, China
**Correspondence Author*

Abstract: ***Post-hemorrhoidectomy recovery is often dominated by nociceptive pain, internal anal sphincter spasm, difficult first evacuations, reactive edema, minor bleeding, and the ever-present risk of fecal contamination over an unepithelialized wound. Warm sitz bathing is ubiquitous in patient education, yet randomized evidence for robust analgesic or healing benefits remains inconsistent across studies that vary in water temperature, duration, timing, flow characteristics, and comparator care. In Chinese clinical practice, external washing with multi-herbal preparations—here rationalized under the archetype Zhiyan Chongxi San (ZCS)—is commonly paired with warm water exposure, aiming to add antimicrobial, anti-inflammatory, astringent, and epithelializing actions. In parallel, circadian chronobiology demonstrates pronounced morning peaks in colonic motor activity (high-amplitude propagated contractions and the post-breakfast gastrocolic reflex) and reveals time-of-day differences in pain processing and cutaneous wound repair. This review synthesizes guidance statements and randomized trials; reframes sitz bathing as a dose-controlled, engineered hydro-thermotherapy with defined temperature, time, and flow; integrates a quality-controlled ZCS formula with pharmacognosy and microbiology; and proposes a pragmatic randomized trial comparing Mao-hour (≈05:00–07:00) versus evening bathing within standardized care bundles. We argue that a morning-timed, single-use, thermometer-verified 40–42°C soak for 10–15 minutes, sequenced immediately before the day's first evacuation, followed by a brief rinse, pat-dry, and application of evidence-based topicals (diltiazem, metronidazole, or sucralfate) is physiologically coherent, operationally feasible, and culturally consonant. Herbal washing is mechanistically plausible but requires GMP-style quality control and rigorous randomized evaluation before broad recommendation. The paper concludes with a Quality-by-Design framework, safety safeguards, health-economic considerations, and a full trial blueprint.***

Keywords: Hemorrhoidectomy, Chronotherapeutic, Sitz Bath of Chinese Medicine, Mao Hour.

1. Introduction

Hemorrhoidectomy remains a definitive therapy for advanced hemorrhoidal disease. Whether conducted by open excision (Milligan–Morgan), closed technique (Ferguson), stapled hemorrhoidopexy, doppler-guided dearterialization, or energy-based modalities, the early postoperative course is dominated by pain, internal anal sphincter (IAS) hypertonia, difficult evacuations that traumatize raw anoderm, reactive edema, and minor bleeding. Contemporary practice emphasizes multimodal analgesia, stool softening, hydration, and perineal hygiene; warm sitz baths are almost uniformly recommended despite decades of debate over their efficacy beyond comfort [1–4]. Much of the uncertainty arises because "sitz bath" has been treated as a monolithic instruction rather than an intervention with a quantifiable thermal dose, exposure time, fluid flow, and temporal choreography relative to defecation and topical pharmacology.

In East Asian pathways, particularly China and Taiwan, warm bathing is often paired with external washing using multi-herbal preparations formulated to clean, soothe, reduce exudation, and promote epithelialization. This practice, while common, exhibits heterogeneity in botanical identities, extraction protocols, concentrations, and quality safeguards, making interpretation of clinical signals difficult across institutions. Meanwhile, chronobiology has matured, with high-resolution manometry and ambulatory recordings elucidating the temporal patterning of colonic mass movements, especially the clustering of high-amplitude propagated contractions (HAPCs) after awakening and meals [6–9]. The post-breakfast gastrocolic reflex is a robust and clinically harnessed motor program that can be enlisted to ease morning evacuation. At the tissue scale, experimental and registry-based evidence suggests that wounds incurred during biological daytime heal faster than those at night, implicating clock control of cytoskeletal dynamics and inflammatory gene expression [10–12]. Pain also follows a diurnal rhythm that can modulate analgesic responses [11,12].

These converging strands invite a re-examination of sitz bathing not as "optional comfort" but as a time-sensitive, engineered element within an integrated morning routine. We articulate the physiological rationale, distill evidence from guidelines and trials, propose a dose–time–flow prescription, rationalize a standardized ZCS archetype with chemical markers and microbiology, and lay out a clinical trial to adjudicate whether synchronizing care to the Mao hour confers advantage beyond non-timed practice.

2. Methods and Scope of Review

We queried MEDLINE, Embase, and the Cochrane Library using terms related to hemorrhoidectomy, sitz bath, electronic bidet, perineal hygiene, colonic motility, HAPCs, gastrocolic reflex, circadian wound healing, pain chronobiology, and topical agents (diltiazem, metronidazole, sucralfate). We also searched pharmacognosy and ethnopharmacology sources for Phellodendron cortex (berberine), Sophora flavescens (matrine/oxymatrine), Sanguisorba officinalis (tannins, triterpenoids, flavonoids), and Galla chinensis (gallotannins/tannic acid). English-language clinical and mechanistic studies, society guidelines, and nursing protocols were prioritized. Where direct evidence for parameters (e.g., exact ZCS marker concentrations in the final bath) was lacking, we offered transparent extrapolation from related topical and wound-science literature with explicit labeling as inferential rather than evidentiary.

3. Clinical Guidance and Trials: What Is the Role of Sitz Bathing?

Authoritative guidance reflects the ambivalence of the literature. The 2024 Clinical Practice Guidelines of the American Society of Colon and Rectal Surgeons (ASCRS) acknowledge widespread advice to perform warm sitz baths for comfort after hemorrhoid procedures, while noting limited and heterogeneous evidence for analgesic or healing efficacy [1,2]. The PROSPECT initiative, which tailors postoperative pain recommendations to specific procedures, prioritizes topical pharmacologic agents—diltiazem, metronidazole, sucralfate, and carefully dosed nitrates—over sitz baths in terms of strength of evidence for reducing early pain [3].

Randomized and quasi-randomized trials show inconsistent findings. In an earlier controlled study, Gupta reported no significant reduction in pain, analgesic consumption, or time to wound healing with warm sitz bathing versus control after excisional hemorrhoidectomy [4]. More recent pragmatic experiences have compared bathing with temperature-controlled electronic bidet irrigation, which delivers a gentle, lower-force warm water stream; one randomized trial suggested broadly comparable pain trajectories over the first week [5]. Systematic reviews and nursing updates emphasize the safety and acceptability of warm sitz baths while calling attention to small sample sizes, variable temperatures (30–42°C), nonstandardized durations, inconsistent timing relative to defecation, and heterogeneity in comparator care [8].

Interpreting these data, we propose three pragmatic points. First, warm water exposure is safe when governed by a thermometer and hygienic practice. Second, the thermal dose, exposure time, and flow are modifiable and likely drive clinical variability across trials. Third, the timing relative to the first morning evacuation is not a trivial aesthetic but a physiologically consequential choice, because it aligns a transiently lowered resting pressure with an endogenous propulsive waveform driven by HAPCs and the gastrocolic reflex.

4. Pathophysiology of Pain, Sphincter Tone, and Why Warmth Helps

Post-hemorrhoidectomy pain emerges from nociceptor activation in denuded anoderm, ischemic tension at suture lines, edema-induced distortion of mechanoreceptors, and the reflexive tightening of the IAS. Inflammatory mediators — prostaglandins, bradykinin, cytokines — sensitize TRPV1/ TRPA1 channels on A-δ and C-fiber terminals, lowering thresholds and amplifying inputs. At the spinal level, repeated barrage produces NMDA-dependent wind-up and central sensitization. IAS manometry reveals that even mild intraluminal distension can sustain elevated resting pressure early after surgery. Heat offers a counter-signal: immersion at 40–42 °C for about 10–15 minutes induces local vasodilation and a thermosphincteric relaxation that reduces basal tone for the critical minutes spanning the first evacuation. This reduction in tone, combined with a cleaner wound bed after rinsing, decreases frictional trauma as stool passes over raw surfaces. The benefit is small in absolute terms but strategically placed during the time of the day when evacuation is most likely [6–9,10–12].

5. Engineering a Dose: Temperature, Time, and Flow

A practical prescription arises from sphincter physiology and safety. We recommend 40–42 °C verified by an immersed thermometer, 10–15 minutes of exposure, and either static immersion or gentle continuous low-shear inflow/outflow that exchanges a modest fraction of volume per minute while maintaining temperature. Exposures below ≈38 °C likely underdose the thermal effect on IAS tone; temperatures above 43 °C invite scald risk, especially in patients with neuropathy, older adults, or transient sensory impairment after neuraxial anesthesia. Flow should be warm and gentle; cold or forceful streams may provoke reflex tightening. The bath solution is single-use and discarded each session to limit microbial growth.

6. Hygiene and Basin Engineering: From Folklore to Infection Prevention

The perineal wound exists in a moist, colonized environment. Reusable basins can harbor Gram-negative and Candida biofilms even under apparently conscientious cleaning if detergents and drying are inconsistent. Contemporary surveys in acute-care hospitals still recover potential pathogens from bath basins, prompting infection-prevention advisories for single-patient basins, detergent cleaning, thorough rinsing, and air-drying between uses, alongside explicit policies to avoid soaking items in basin water [32,33]. Sit-bath solutions—whether water alone or herbal—are single-use by policy; the early postoperative window is not the time for thrift at the expense of contamination risk.

Circadian Physiology: Why the Mao Hour (≈05:00–07:00)?

Colonic motor behavior is strongly time-structured. HAPCs—propagated mass movements that traverse long segments and herald defecation—cluster after awakening and meals and are sparse during nocturnal sleep [6–9,24]. The gastrocolic reflex after breakfast recruits distal propulsion through neurohumoral pathways and has long been used to train bowel habits in constipation [9]. Leveraging these rhythms, a morning-timed bath aligns the transient reduction in resting anal pressure with an endogenous propulsive surge, lowering the threshold for a comfortable first evacuation. At the tissue level, daytime injuries in human registry analyses have shown faster healing than night-time injuries, with mechanistic work implicating clock-controlled cytoskeletal remodeling and inflammatory gene expression in fibroblasts and keratinocytes [10–12]. Pain sensitivity and analgesic responses also vary across the day, offering a second axis on which timing may matter [11,12]. The “Mao hour” designation from traditional time-medicine corresponds closely to this physiological window, providing a culturally familiar anchor without claiming premodern doctrine as causal proof.

7. A Rationalized Herbal External-Washing Archetype (ZCS) and Its Pharmacology

Within Chinese colorectal nursing practice, external washing with multi-herbal preparations—decoctions or concentrates diluted into warm water for sitz bathing—has long been used. To move beyond heterogeneity, we propose a standardized ZCS archetype composed of Phellodendron cortex (10 g), Sophora flavescens radix (10 g), Sanguisorba officinalis radix (12 g), Galla chinensis (6 g), and Angelica sinensis radix (6 g) per 2 L bath, with optional trace menthol/borneol (≤0.1 g) for sensory acceptance. Double-decocting (30 minutes + 20 minutes), filtration, and concentration to ≈1.5 L, followed by dilution with freshly boiled water to 2.0 L at the target temperature, yield a reproducible soak. For GMP concentrates, we specify marker content in the final bath: berberine ≥0.5 mg/mL; total gallotannins (as tannic-acid equivalents) ≥0.3 mg/mL; combined matrine+oxymatrine ≥0.1 mg/mL; pH 6.0–7.5; and microbial/metal/pesticide limits within pharmacopeial standards.

Mechanistically, berberine and related protoberberines suppress NF-κB/MAPK signaling, attenuate inducible nitric oxide synthase and oxidative stress, and exert broad antimicrobial action against Gram-positive, Gram-negative, and fungal organisms. Matrine and oxymatrine display anti-inflammatory and antifibrotic effects and have been engineered into topical or nanocarrier systems that accelerate dermal healing in preclinical studies. Sanguisorba's tannins and triterpenoids contribute rapid hemostasis and support re-epithelialization and collagen remodeling; rhoifolin-rich fractions show keratinocyte-motility benefits. Galla chinensis provides gallotannins that precipitate proteins to stabilize the superficial barrier, reduce exudation, and impair microbial adhesion and biofilm metabolism. Warmth-induced vasodilation and the thermosphincteric relaxation likely improve distribution and superficial contact of these actives, while the subsequent pat-dry and topical occlusion increase dwell time [17–23,25].

8. Integration With Evidence-Based Topical Pharmacology

Water-based care should complement, not replace, topical pharmacology with stronger evidence. Meta-analyses and randomized trials support diltiazem 2% ointment in reducing early pain and facilitating defecation with fewer headaches than nitrates; topical metronidazole 10% reduces pain at rest and during defecation and may lessen malodor by anaerobic control; sucralfate 10% appears to reduce pain and accelerate epithelial coverage in blinded comparisons [13–16,29–31]. A pragmatic sequence — bath → unhurried evacuation → brief rinse → pat-dry → thin application of diltiazem plus either metronidazole or sucralfate — provides nonoverlapping mechanisms in a physiologically favorable morning window. Osmotic laxation with polyethylene glycol and fiber titrated to Bristol 4–5 stool form minimizes shear forces across the fresh wound.

9. Safety and Special Populations

When governed by a thermometer and time-limited to 10–15 minutes, warm sitz bathing is generally safe. Nonetheless, case reports describe perianal burns from overheated sitz baths in adults and children; residual neuraxial anesthesia or neuropathy can blunt heat perception and increase risk [26,27,37]. Herbal additives can provoke irritant or allergic contact dermatitis, particularly at high tannin concentrations or with essential-oil adulteration. Single-use solutions, single-patient basins, detergent cleaning with rinse and air-dry, and explicit instructions to avoid undiluted oils or salts mitigate risk. Pregnancy and lactation present minimal systemic exposure from short external soaks, but when uncertain, warm water alone plus evidence-based topical pharmacology is prudent.

10. Implementation in Wards and Homes: Human Factors and Equity

A credible protocol must work under common constraints. On wards, early-morning workflows can adopt a rotating cadence that starts patients at five-minute intervals (e.g., 05:25, 05:30, 05:35), allowing nurses to cycle through temperature checks, initial immersion, and supervised exit. At home, a low-cost kit containing a basin, thermometer, single-use herbal sachets, and gauze, paired with pictogram instructions, addresses literacy and resource variability. Documentation fields are intentionally lean—temperature, duration, pain before/after (0–10), stool form, visible bleeding, exudation, and skin reactions—supporting quality improvement without burden. Framing the routine as culturally consonant morning hygiene rather than a burdensome "treatment" can raise adherence in multigenerational households. Where herbal allergy or preference precludes botanicals, the same morning-aligned bath with water only preserves physiologic benefits.

11. Health-Economic Considerations

The direct costs of a basin, thermometer, and gauze are modest relative to the experiential benefit of a calmer first evacuation and the potential reductions in analgesic demand and unscheduled consultations. While definitive cost-utility analyses await randomized data, a cost-consequence perspective suggests that engineered sitz baths are unlikely to increase costs and may enhance patient-reported outcomes. If herbal concentrates are used, batch-produced GMP sachets with barcoded lot IDs ease documentation and pharmacovigilance.

12. Quality by Design (QbD) for ZCS Concentrates

To bridge traditional practice and international research standards, we define critical quality attributes (CQAs) of the final bath—marker content, pH, clarity, bioburden, heavy metals, pesticide residues, and absence of objectionables — and critical process parameters (CPPs)—botanical identity authentication (voucher and DNA where feasible), grinding size, double-decoction time–temperature profile, filtration, and concentration endpoint. Analytical release via HPLC/UPLC uses external standards (berberine chloride, matrine, oxymatrine, tannic acid) with validated methods. Stability studies at 4 °C and room temperature document 24-hour marker retention (≥90%) and pH drift (≤0.2), though clinical use remains single-session. Container–closure compatibility testing screens for leachables by non-targeted LC–MS. Each lot's barcode links to case-report forms, enabling lot-level safety signal detection if dermatitis clusters

occur.

13. Trial Blueprint: Testing the Mao-Hour Hypothesis

A multicenter, randomized, assessor-blinded superiority trial directly tests timing. Adults undergoing open hemorrhoidectomy are randomized 1:1 to morning (05:30–06:30) versus evening (19:00–20:00) ZCS baths, matched for temperature (40–42°C), duration (10–15 minutes), and frequency (twice daily days 1–3, then once daily to day 7), within identical bundles of laxation and topicals. Coprimary endpoints include pain area-under-the-curve (AUC) over days 1–3 and first-defecation peak pain. Secondary outcomes include time to epithelial closure adjudicated from standardized photographs by masked raters, edema/exudation scores, bleeding events, defecatory difficulty, time to return to usual activity, satisfaction, and safety events. Mechanistic substudies measure resting anal pressure, laser-Doppler perfusion, perineal skin temperature by infrared thermography, and serial wound swabs for microbial burden and biofilm markers. Adherence and fidelity are monitored with thermometer data-loggers capturing session temperature/time; real-time alerts flag exposures outside 38–43 °C. The sample size targets a conservative 0.6 SD difference in pain-AUC with 90% power at $\alpha=0.05$, allowing for 15% attrition. Analyses follow intention-to-treat with mixed-effects models and prespecified subgroups (baseline constipation, anxiety). Ethics, registration, and a posted protocol/statistical analysis plan ensure transparency.

14. Controversies, Caveats, and How This Framework Addresses Them

Skeptics may argue that warmth merely provides transient comfort without measurable clinical endpoints. We respond that a strategically placed, reproducible “dose” in a physiologically favorable window can reduce first-defecation peak pain and early pain AUC, outcomes that matter to patients and can be captured with validated tools. Others may question the relevance of herbal actives given inconsistent literature; our position is that standardized, quality-controlled concentrates can be fairly tested in randomized comparisons and that water-only morning baths remain acceptable. Finally, concerns about feasibility in busy wards are addressed by human-factors-informed cadences and minimal documentation.

15. Conclusions

Engineered, morning-aligned warm bathing is safe and plausibly beneficial for comfort after hemorrhoidectomy when treated as a dose-controlled intervention sequenced with defecation and topical pharmacology. A rationalized, GMP-controlled ZCS may add biologically plausible benefits but requires rigorous randomized evaluation. The present framework provides a tractable path to adjudicate the timing hypothesis, standardize herbal washing, and elevate a ubiquitous recommendation from folklore to testable clinical science.

1) Extended Evidence Review and Methodological Appraisal

The uneven signal seen across randomized and quasi-randomized studies of bathing after hemorrhoidectomy becomes intelligible once the constituent biases and parameter drift are examined with care. Trials that fail to control temperature effectively collapse heterogeneous exposures into a nominal intervention; when “warm” is defined by the patient’s wrist or by unmonitored tap water, thermal dose decays quickly and inter-arm contamination becomes likely as controls adopt ad hoc rinsing. Duration is similarly slippery. Reports that specify “baths as needed” introduce a behavioral confound because patients who hurt more bathe more often, eroding any intention-to-treat contrast and obscuring directionality. Timing with respect to defecation is perhaps the most consequential omission; a bath several hours after the first evacuation is mechanistically distinct from one scheduled immediately before the gastrocolic surge. The Gupta trial, often cited as negative [4], is interpretable in this light: if the intervention’s temperature and timing were not enforced to align with the morning motivation for HAPCs, and if analgesic regimens and laxation were not harmonized, the expected small effect of warmth would be diluted to noise. Conversely, studies that have attempted to control the warmth and the flow—for example those that used temperature-controlled electronic bidet irrigation—reported trajectories that did not differ meaningfully from sitz bathing, suggesting that what matters is not the vessel but the delivered thermal and cleansing dose [5].

Risk-of-bias domains extend beyond exposure fidelity. Allocation concealment and blinding of outcome assessors are unusually important when primary endpoints are subjective pain ratings. Where possible, photographic adjudication of epithelial closure by masked reviewers, as proposed in our blueprint, reduces observer bias and yields portable evidence across centers. Co-interventions must be standardized: scheduled acetaminophen and NSAIDs, an osmotic laxative titrated to Bristol 4–5, and a prespecified topical pharmacology pathway (diltiazem, metronidazole, sucralfate) [13–16,29–31]. Without these anchors, the incremental value of bathing is inseparable from analgesic practice variance. Attrition, particularly in home-managed patients, can be mitigated by simplifying documentation and collecting key outcomes close to the event—first-defecation peak pain recorded within minutes of the event rather than at end-of-day recall—thereby dampening memory bias. Finally, sample sizes should be powered against area-under-the-curve pain measures that integrate multiple timepoints, acknowledging that any single morning may be noisy but the trajectory across three days is stable and clinically meaningful.

A further source of heterogeneity arises from the baseline bowel habit. Patients who chronically suppress the urge to defecate or who present with long-standing constipation have a different colonic motor phenotype than those with brisk gastrocolic responses. Morning alignment is a priori more likely to benefit the latter. Our blueprint therefore prespecifies subgroup analyses by constipation history and baseline anxiety—constructs with independent effects on defecatory pain and analgesic consumption—and suggests ancillary actigraphy or sleep diaries to identify patients whose biological morning does not coincide with clock time [28]. This appreciation of heterogeneity of treatment effect is not a luxury statistical flourish; it is the difference between a

plausible negative average result and a clinically salvageable positive signal in the right patients.

2) Mechanistic Deepening: Peripheral Transduction, Spinal Processing, and Pelvic Coordination

A denuded anoderm is a perfect stage for peripheral sensitization. Protons, ATP, and potassium released by cell injury gate acid-sensing ion channels and P2X receptors, while bradykinin and prostanoids increase cAMP/PKA and PKC activity, which in turn phosphorylate TRPV1 and TRPA1, lowering activation thresholds. Keratinocytes are not passive; they release cytokines and growth factors that recruit neutrophils and macrophages. The resultant milieu bathes polymodal nociceptors and lowers thresholds for mechanical and thermal stimuli. The IAS, meanwhile, furnishes a tonic squeeze that, in health, contributes to continence but, in the post-excisional state, exacerbates every contact. Warmth at 40–42 °C is sufficient to widen cutaneous microvessels and accelerate interstitial clearance of sensitizers; it also engages a thermosphincteric relaxation that, though transient, overlaps the minutes of greatest consequence. The choreography of pelvic floor striated muscles matters as well: catastrophic guarding during the first evacuation couples valsalva with paradoxical anal contraction. A scripted morning routine that pairs warmth with diaphragmatic breathing interrupts this cascade and substitutes deliberate coordination for panic.

At the spinal level, dorsal horn neurons exposed to repeated C-fiber input undergo NMDA-dependent wind-up. The timing of inputs matters; if the morning bath defers the most intense nociceptive burst by easing the first stool passage, a proportion of the day's cumulative spinal potentiation may be preempted. This is one pathway by which a small thermal effect magnified by timing could translate into a measurable reduction in pain area-under-the-curve across days 1–3. The congruence with circadian influences on pain processing — documented diurnal swings in thresholds and analgesic responsiveness—strengthens the plausibility that the early morning window is not equivalent to the evening [11,12,28].

3) Comparative Pharmacology and Device Context

The posture of this review is not that warm bathing replaces topical pharmacology but that it sets the stage for it. Diltiazem 2% ointment reduces IAS tone pharmacologically and has shown early pain reductions without the nitrate-linked headache penalty, positioning it as a rational partner for warmth [14,30]. Topical metronidazole (10%) diminishes pain at rest and during defecation and plausibly reduces malodor via anaerobe control, a social benefit that is under-measured in trials but salient for patients [13,29,31]. Sucralfate (10%) contributes a protective barrier and growth-factor binding that accelerates epithelial coverage in blinded comparisons [15,16]. The morning sequence—soak, evacuate, rinse, pat-dry, apply—maximizes the clean, low-tone canvas on which these agents act. When basins are impractical, temperature-controlled electronic bidet irrigation with lower-force streams appears to deliver an equivalent dose of warmth and gentle cleansing, at least in first-week trajectories, underlining that the thermal and mechanical dose, not the device label, is the driver [5]. The main caution against cold irrigation in the first days concerns reflex IAS tightening; patients attracted to the numbness of cold should be counseled that it may be counterproductive for evacuation.

4) Quality by Design Expanded: Chemistry, Microbiology, and Stability

The translation of herbal washing from ward lore to trial-ready product zeroes in on control of identity, potency, purity, and stability. Identity begins with authenticated raw materials—botanical voucher specimens and, where feasible, DNA barcoding to discriminate closely related species. Potency is operationalized not by vague decoction strength but by marker concentrations in the final bath: berberine, total gallotannins, and matrine+oxymatrine, measured by HPLC/UPLC against external standards with validated methods (linearity, accuracy, precision, LOD/LOQ). Purity encompasses microbial enumeration (TAMC/TYMC) and absence of objectionables (Pseudomonas, Enterobacteriaceae, Staphylococcus aureus, Candida), heavy metals, pesticide residues, and aflatoxins within pharmacopeial limits. Stability is a 24-hour problem in clinical practice—baths are single-use and discarded—but concentrates should document marker retention ≥90% and minimal pH drift at 4 °C and room temperature. Container–closure compatibility demands non-targeted LC–MS screening for leachables; amber, food-grade packaging with low extractables is preferred. Each lot's barcode links to case-report forms, enabling pharmacovigilance down to the batch if dermatitis clusters or atypical signals appear. This level of chemistry-microbiology transparency is what persuades skeptical readers that a trial's "herbal wash" is not a moving target but a reproducible exposure [17–23,25,41,46].

5) Implementation Science, Equity, and Human Factors

Engineering a human routine is as important as engineering the bath. On wards, a staggered cadence at five-minute intervals permits a single nurse to check temperatures, cue immersion, and supervise exit without rush, preserving dignity and safety. At home, visual instruction cards that depict thermometer placement, the waterline, a clock face marking the 10–15-minute exposure, and pat-dry technique reduce errors in households where health literacy varies. Equity lodges in the details: not every home has a temperature-controlled bidet, but every home can have a clean basin, a thermometer, and a discardable sachet. Framing the practice as morning hygiene aligned with breakfast and a short walk increases adherence compared with technical chronobiology language. Documentation is deliberately lean and consequential: temperature, duration, pain immediately before and after, stool form, bleeding, exudation, and any skin reaction. These data, aggregated, animate quality - improvement cycles and give clinicians the confidence that "bathing" means the same intervention from one patient to the next.

6) Health-Economic Perspective and Pragmatic Value

The economics of a morning-timed, engineered sitz bath are intuitive. Direct costs—basin, thermometer, gauze, single-use sachets—are small; nursing time is the chief resource on wards. Savings are diffuse but real: a flatter early pain trajectory can mean fewer rescue calls and opioid scripts, a

calmer first defecation can avert unplanned clinic visits, and clarity about timing and technique can reduce duplication of nursing instruction. Even without a formal cost-utility model, a cost-consequence analysis that tabulates equipment and time against analgesic consumption and return-to-activity days is feasible and could be appended to the randomized trial. Because the intervention is culturally acceptable, it faces fewer adoption barriers than device-heavy alternatives.

7) Trial Conduct, Data Integrity, and What "Meaningful" Means

The superiority trial outlined earlier acquires credibility by building adherence sensing and blinded adjudication into its bones. A data-logging thermometer turns fidelity into a recorded reality; smartphone prompts harmonize timing; real-time alerts flag off-target exposures. First-defecation peak pain, collected contemporaneously, captures the clinically dreaded moment. Epithelial closure adjudicated from standardized photographs by masked raters brings objectivity to healing. Mechanistic substudies—resting anal pressure, laser-Doppler perfusion, thermography, microbial burden—are not ornaments; they test whether pain changes co-travel with physiologic and microbiologic signatures. A one-point reduction on the 0–10 NRS for first-defecation peak pain is likely meaningful to patients; sustained across days 1–3 it will translate to a discernible AUC difference. Even if epithelialization time is unchanged, a quieter experience may justify adoption in many systems given the low risk and the minimal cost [13–16, 29–31].

8) Ethical and Regulatory Considerations

Standardizing herbal washing invites regulatory clarity. In many jurisdictions, an external washing concentrate straddles categories: it is not a systemic drug, but neither is it a cosmetic when used on fresh surgical wounds. The pragmatic path in academic trials is to treat the concentrate as an investigational product with GMP-style release testing and batch documentation, ethics approval, and explicit patient information about risks of dermatitis and scald. Cultural respect is not window dressing; patients who view morning washing as ordinary hygiene are partners rather than subjects. Consent materials should be literate but plain, avoiding exaggerated claims and clearly stating that water-only bathing remains acceptable.

9) Looking Forward: What Success and Failure Will Teach

If the Mao-hour hypothesis holds—if morning alignment reduces pain AUC and first-defecation peaks without added risk—the intervention scales easily and fits diverse care environments. If the trial is neutral, it will still have clarified that warmth is best considered permissive comfort within a pharmacologic bundle, and it will have endowed future practice with precise parameters and safety rules. Either way, bathing ceases to be an unexamined ritual and becomes a tested element with known limits. The research dividend is a template for how to translate other culturally anchored practices—timed meals, timed movement—into modern, measurable care aligned with physiology.

References

[1] Hawkins AT, Glasgow SC, Steele SR, et al. The American Society of Colon and Rectal Surgeons Clinical Practice Guidelines for the Management of Hemorrhoids. 2024. ASCRS.

[2] ASCRS Toolkit. Management of Hemorrhoids (2024 update). ASCRS Toolkit online resource.

[3] Bikfalvi A, Estany J, Fischer HBJ, et al. PROSPECT guideline for haemorrhoid surgery: procedure-specific postoperative analgesia. Eur J Anaesthesiol. 2023; 40(6): 414–427.

[4] Gupta PJ. Warm sitz bath does not reduce symptoms in the post-haemorrhoidectomy period: randomized, controlled study. ANZ J Surg. 2008;78(5):398–401.

[5] Kwon YH, Park J, Lee J, et al. Warm sitz bath versus electronic bidet with lower-force warm flow after hemorrhoidectomy: randomized trial. BMC Surg. 2025; 25: 88.

[6] Bharucha AE. High-amplitude propagated contractions. Neurogastroenterol Motil. 2012;24(10):977–982.

[7] Smith TK, Park KJ, Hennig GW. Colonic migrating motor complexes and high-amplitude propagating contractions: integrated motor events. J Neurogastroenterol Motil. 2014;20(4):423–446.

[8] Hibberd TJ, Ellis M, Szczesniak MM, Kyloh M, et al. Circadian rhythms in colonic function. Front Physiol. 2023; 14: 1239278.

[9] Malone JC, Hyman N. Physiology, gastrocolic reflex. StatPearls. 2023.

[10] Hoyle NP, O'Neill JS, Feeney KA, et al. Circadian actin dynamics drive rhythmic fibroblast mobilization and wound healing. Sci Transl Med. 2017;9(415): eaal2774.

[11] Knezevic NN, Tverdohleb T, Knezevic I, Candido KD. Circadian pain patterns in human conditions: a systematic review. Pain Pract. 2023;23(8):883–899.

[12] Navarro R, Paepe AL, Kocot-Kępska M, et al. Pain chronobiology in clinical-trial participants with neuropathic pain and fibromyalgia. Pain Rep. 2025; 10(3): e1120.

[13] Eberspacher C, Sacco M, Milone M, et al. Topical metronidazole after haemorrhoidectomy to reduce postoperative pain: systematic review. Colorectal Dis. 2024; 26(10): 1123–1132.

[14] Huang YJ, Wang YL, Tsai YT, et al. Topical diltiazem ointment in post-hemorrhoidectomy pain relief: meta-analysis. Asian J Surg. 2018;41(6):539–545.

[15] Ala S, Eshghi F, Enayatifard R, et al. Efficacy of 10% sucralfate ointment in reducing acute postoperative pain after open hemorrhoidectomy: randomized, blinded, controlled study. World J Surg. 2012;36(8):2297–2302.

[16] Rudiman R, et al. Topical sucralfate decreases pain and improves healing after hemorrhoidectomy: randomized, blinded, controlled study. Dis Colon Rectum. 2022; 65(2): e203–e211.

[17] Choi YY, Cheong KJ, et al. Anti-inflammatory potential of Cortex Phellodendron via NF-κB/MAPK inactivation. Int Immunopharmacol. 2014;20(2):192–200.

[18] Ren Y, Chen G, et al. Galla chinensis: phytochemistry and pharmacology. J Ethnopharmacol. 2021; 279: 114347.

[19] Zhou P, Su G, et al. A comprehensive review of Sanguisorba. Front Pharmacol. 2021;12:750165.

[20] Muzykiewicz-Szymańska A, Nowak A, et al. Sanguisorba officinalis ethanolic extracts and essential oil: antioxidant and pharmacological profile. Front Pharmacol. 2024;15:1390551.
[21] Zhang X, Wang Z, et al. Exosome-mimetic vesicles carrying matrine promote wound healing. Bioeng Transl Med. 2024;9(2):e10444.
[22] Cheng L, Li J, et al. Effect of Galla chinensis on microcosm biofilms. J Dent. 2011;39(9):668–675.
[23] Djakpo O, Yao W. Rhus chinensis and Galla chinensis — folklore to modern evidence. Phytother Res. 2010; 24: 1739–1747.
[24] Bassotti G, Germani U, et al. High-amplitude propagated contractions in humans: manometric observations. Am J Physiol. 1988; 255(5 Pt 1): G660–G664.
[25] Guimarães I, et al. Tannic acid tailored microsystems for wound infection control. Pharmaceutics. 2023; 15(2): 398.
[26] Kahraman A, Karaca K, Etöz A, Ozcan M. Perianal burn as a complication of hot water sitz bath. Burns. 2004; 30(8): 868–870.
[27] Ameh EA, Abdulwahab RA. Perineal burns from sitz bath in children: case reports. Niger Postgrad Med J. 2000;7(3):137–138.
[28] Bumgarner JR, McCall WV, Goodin BR. Circadian rhythms, pain, and opioids. Front Neurosci. 2023; 17: 1109480.
[29] Di Re A, Loria F, et al. Metronidazole for post-hemorrhoidectomy pain: a systematic review. Ann Coloproctol. 2020;36(4):213–221.
[30] Abidi SS, et al. Topical diltiazem after hemorrhoidectomy: a randomized clinical experience. Cureus. 2021;13(3):e14167.
[31] Ala S, Saeidian S, et al. Topical metronidazole reduces pain after surgery and during defecation following haemorrhoidectomy. Dis Colon Rectum. 2008; 51(10): 1689–1694.
[32] Sturgeon LP, et al. Bathing practices in acute care hospitals: current state and implications. Am J Infect Control. 2019;47(8):971–974.
[33] Quinn BJ, et al. Microbial contamination in reusable healthcare bath basins. Am J Infect Control. 2025; 53(7): e117–e122.
[34] Crowell MD, Bassotti G, et al. Ambulatory monitoring of colonic motor activity and high-amplitude propagating contractions. Am J Physiol. 1991;261(2 Pt 1): G263–G269.
[35] Shirah HA, Zabeery IA, Sogair OA, et al. Salty warm sitz bath in the conservative management of anal fissure: implications for anorectal hydrotherapy. Int Surg J. 2022;9(4):775–780.
[36] Agency for Healthcare Research and Quality (AHRQ). Bath Basin FAQs for Infection Prevention. 2022.
[37] Do HW, et al. Scalding burn after sitz bath following neuraxial block: a cautionary case. Korean J Anesthesiol. 2015;68(4):398–401.
[38] Goswami AG, et al. Biofilm and wound healing: from bench to bedside. J Indian Soc Periodontol. 2023; 27(3): 207–216.
[39] Guo X, et al. Anti-inflammatory effects of Phellodendron amurense bark extract. Not Bot Horti Agrobot Cluj. 2023;51.
[40] Fan KQ, et al. Pharmacological properties of berberine: an updated review. Front Pharmacol. 2025;16.
[41] Yang X, et al. Berberine nanoformulations and their antimicrobial mechanisms. Front Microbiol. 2025;16.
[42] Wu X, et al. Self-assembled rhein–matrine nanoparticles accelerate skin repair. Biomater Sci. 2024;12.
[43] Tang Z, et al. Oxidized Sanguisorba–collagen for hemostatic and wound-healing applications. ACS Appl Bio Mater. 2025.
[44] Negm WA, et al. Rhoifolin-rich Sanguisorba fraction promotes wound healing. Antioxidants (Basel). 2022;11.
[45] Ding X, et al. Tannic acid inhibits biofilms and acid production in oral microcosms. Antibiotics (Basel). 2025;14.
[46] Ren Y, Chen G, et al. Galla chinensis in dentistry: anti-biofilm and remineralization. J Dent Res. 2016; 95(12): 1440–1447.
[47] Fawcett S, et al. MicroRNA and circadian dynamics in wound repair. Front Cell Dev Biol. 2022;10.
[48] Paatela E, et al. Circadian regulation in tissue regeneration. Int J Mol Sci. 2019; 20: 2263.
[49] Bassotti G, et al. More than one century of colonic mass movements in humans. Am J Physiol Gastrointest Liver Physiol. 2021;320:G567–G575.
[50] Duboc H, et al. Disruption of circadian rhythms and gut motility. Neurogastroenterol Motil. 2020;32:e13878.