The American Journal of Medical Sciences and Pharmaceutical Research
ISSN 2689-1026 Volume 08 - 2026

Rehabilitation Strategies for Chronic Nail Fragility

[1] Tetiana Dorobaliuk
[1] Founder of TD Nail Academy. Specialist in Nail Service Quality and Safety
Sunny Isles Beach, Florida, USA

Received: 02 Jan. 2026 | Received Revised Version: 19 Jan 2026 | Accepted: 13 Feb. 2026 | Published: 04 March 2026

Volume 08 Issue 03 2026 | Crossref DOI: 10.37547/tajmspr/Volume08Issue03-03

Abstract

Brittle nails have become one of the most common complaints dermatologists hear, largely because salon practices-particularly acrylics and harsh acid-based products-keep inflicting damage. We reviewed research published from 2015 through 2024 to determine whether severely compromised nails can actually recover. Traditional acidic primers operating at pH 2-3 gradually corrode keratin, creating microscopic damage that builds up with each application. Formulations maintaining pH 5-7 achieve bonding without chemically degrading keratin. Gentler salon approaches-careful cuticle work, minimal filing, replacing acrylics with water-based gel systems-substantially reduce mechanical damage. Home care involves daily moisturizer application, 2.5-5 mg biotin supplementation, wearing gloves during chemical exposure, and taking periodic breaks from all coatings. Clinical evidence shows people who maintain these practices consistently see nail thickness increase 15-25% within 3-6 months. Recovery depends entirely on eliminating harmful practices, sustaining hydration, and providing nutritional support for nail growth. Salon professionals require proper training to recognize damaged nails and adopt evidence-based prevention strategies rather than continuing techniques that provide temporary cosmetic results while causing progressive structural deterioration.

Keywords: fragility of nails, low-acid bases, soft manicure, preventive care, rehabilitation of nails, professional cosmetology

Cite This Article: Dorobaliuk, T. (2026). Rehabilitation Strategies for Chronic Nail Fragility. The American Journal of Medical Sciences and Pharmaceutical Research, 8(03), 28–34. https://doi.org/10.37547/tajmspr/Volume08Issue03-03.

Introduction

Chronic nail brittleness-doctors call it onychoschisis when nails split horizontally and onychorrhexis when they crack lengthwise-is an extremely common problem, particularly among adult women. Brittle nails split easily, the free edge breaks off, the surface gets rough, and growing them to normal length without damage becomes impossible. While brittleness can stem from internal issues like insufficient iron or biotin, hormonal problems, or simply getting older, a substantial portion of cases traces back to external trauma, especially rough cosmetic treatments.

The nail industry has exploded over the last two decades, bringing an explosion in both variety and intensity of cosmetic procedures. Acrylics, gel polish requiring UV curing, electric file manicures with high-speed rotating bits-these have become standard offerings in salons worldwide. They promise lasting results: acrylic overlays hold up for weeks, gel polish keeps its shine without chipping for two to three weeks, electric files prep nails quickly and efficiently.

These technologies, however, punish nails structurally and biochemically. Prepping for acrylics means aggressively buffing the natural nail to roughen the surface, applying acid primers that eat into keratin, then layering monomers and polymers that can seep into the nail itself. Getting acrylics off means either soaking nails in acetone for a long time or grinding them down with an electric file-both brutal.

Traditional gel polish base coats lean heavily on acidic ingredients with low pH to grip the nail hard. These acid primers and bases essentially corrode the top keratin layers, creating tiny fractures that let the coating lock in mechanically. Do it once and the damage looks negligible. Do it every two or three weeks for months or years and the accumulated trauma progressively thins nails, makes them fragile, breaks down their structure.

Chessa's group published work in 2020 dissecting why nails turn brittle-what causes it, how it looks clinically, what you can do about it. Their core discovery: cosmetic treatments cause a huge chunk of acquired brittleness, and you can't fix nails without first stopping the cycle of damage. Trouble is, women keep wrecking their nails regardless-either because they want them to look a certain way or their job basically requires it. Reinecke and Hinshaw studied women's nail health that same year and pinned down how the endless loop of putting on and ripping off fake nails directly drives brittleness and causes the nail plate to separate from the bed underneath.

The proof keeps stacking up that aggressive beauty treatments destroy nails, yet there's still no comprehensive roadmap for rehabilitating nails that have been chronically brutalized. Medical journals fixate on nail diseases with internal origins while mostly ignoring cosmetic-inflicted trauma. Meanwhile, beauty industry publications constantly push the latest products and methods without bothering to examine their long-term consequences on nail integrity.

We systematically reviewed existing research to determine how to rescue chronically damaged nails, concentrating on milder base coat options (reduced-acid or zero-acid formulations) that avoid causing harm, salon methods that substitute for acrylics, trauma-reducing techniques, and realistic prevention frameworks salons can adopt. Our aim: merge dermatological science with salon realities so clients can achieve attractive nails without structural collapse.

Materials and Methods

The study uses a systematic review of the literature addressing nail fragility, cosmetic trauma, rehabilitation strategies, and preventive care protocols. We searched the academic databases PubMed, Web of Science, Google Scholar, Scopus for dermatology and cosmetology publications published 2015-2024 that address nail fragility, the impact of cosmetic practices, treatment and prevention strategies.

We searched databases using nail fragility, brittle nails, onychoschizia, onychorrhexis, nail cosmetics, nail damage, acid-free base coat, gentle manicure, nail rehabilitation, biotin, keratin, nail care protocol, professional cosmetology. Initial sweep grabbed 312 papers that looked potentially relevant. After reading abstracts and digging into full texts, 48 studies made the final cut-they had actual data (not speculation) on nail fragility or cosmetic trauma, offered concrete treatment or prevention recommendations, described methods transparently, appeared in peer-reviewed medical journals or reputable professional beauty publications.

We sorted rehabilitation methods into groups. Stuff you put on nails: gentler base coats with less or no acid, moisturizers, keratin treatments. Salon work that doesn't brutalize: cuticle care without scraping, light filing, dropping acrylics for something less destructive. Things you swallow: biotin pills, other vitamin and mineral supplements, diet changes. Ways to prevent damage: taking breaks from polish, keeping nails away from harsh chemicals, getting salons to adopt better standards.

For each group, we pulled together what studies found, noted where specialists saw eye-to-eye, marked questions nobody's answered yet. We judged how good the evidence was by looking at study design, how many people participated, whether there were comparison groups, how long researchers followed subjects, whether outcomes actually made a difference you'd notice.

Results

Nails turn brittle when their keratin framework falls apart, lipids leak out, and they dry up. Healthy nails jam keratinocytes together densely, packed with hard alpha-keratin formed into fiber bundles cross-linked by disulfide bridges between cysteine amino acids. Lipid stuff-ceramides, cholesterol, free fatty acids-fills spaces between cells like grout between tiles. Normal nails retain roughly 10-15% water content, which stops them snapping when they bend.

Chessa's team sorted brittle nail triggers in 2020 into three groups: idiopathic (mystery-can't identify why), systemic (internal health problems), external (outside attack). External damage accumulates from constant contact with cleaning chemicals, industrial solvents, prolonged water immersion, mechanical abuse, vicious salon treatments. Their key discovery: external damage actually heals once you eliminate the source and shield nails properly-completely unlike systemic damage, which persists until you address whatever's malfunctioning internally.

Traditional acid primers and base coats crash the pH down to 2-3, literally corroding the nail surface. That roughness gives the coating something to grab onto. Scheers' research team examined nail cosmetics in 2024 and conceded acid primers stick well but wreck nails with repeated applications. What they recommended: if your nails are already brittle or damaged, ditch acid primers entirely and switch to milder or acid-free alternatives.

Low-acid bases operate around pH 5-6. Acid-free bases hover near neutral at pH 7. Both manage to make coatings adhere without eating through keratin. Low-acid formulas use gentler acids in reduced concentrations-creating just enough texture for grip without the corrosive destruction. Acid-free bases skip acids completely, depending on polymer resins that attach to nails mechanically and chemically without any etching. Acid-free bases used to have terrible reputations for weak bonding and coatings that lifted early, but newer versions using better polymer science perform adequately without destroying nail health.

Academic research on low-acid and acid-free systems barely exists-most of what we know comes from salon reports and what manufacturers claim. Baran's team did run a proper randomized trial in 2019 using hydroxypropyl chitosan varnish on brittle nails, either alone or paired with oral biotin. Their study looked at treatment polish rather than base coats, but it demonstrated that topical products working without acid etching can actually improve nails. Participants using varnish plus biotin experienced the most dramatic improvements in nail thickness and fewer splits.

Soft manicure technologies represent an alternative to traditional aggressive practices. Hardware manicure with high-speed electric cutters rotating at a speed of 20,000-35,000 revolutions per minute creates significant mechanical and thermal trauma when performed incorrectly. The pressure of the cutter on the nail plate, especially when using coarse abrasive nozzles, can cut off a significant part of the nail thickness. Friction from high-speed rotation generates heat that can reach temperatures sufficient to partially denature keratin proteins.

Iorizzo wrote in 2015 about managing the five most frequent nail problems, including brittleness. For fragile nails, recommendations included avoiding harsh buffing, using soft files rated 240 grit or higher, filing in one direction only rather than back-and-forth, limiting water and detergent exposure, and applying moisturizer regularly.

Alternatives to acrylics include water-based gel polishes that don't demand aggressive nail surface preparation. Standard gel polishes require buffing away the natural lipid layer on the nail to achieve adhesion. Water-based gels bond to less-prepared surfaces, cutting down mechanical trauma. They also typically come off without prolonged acetone soaking, reducing dehydration from the removal process.

Dinani and George (2019) reviewed nail cosmetics from a dermatological perspective, discussing the potential harmful effects of various products and practices.They noted that repeated application and removal of artificial nails was associated with onycholysis, fragility, and superficial onychomycosis. They recommended periodic rest periods without coatings to allow the nail to recover, the use of protective base coats to minimize direct contact between pigmented varnishes and the nail plate, and the avoidance of aggressive removal by scraping or pulling.

Systemic nutritional support plays a role in the rehabilitation of brittle nails. Biotin, a water-soluble B vitamin, has received the most attention for treating brittle nails. Lipner and Scher (2018) reviewed the evidence for biotin in the treatment of nail diseases, finding that although controlled trials are limited, several uncontrolled studies have shown improvement in nail thickness and reduction in splitting with daily doses of 2.5 mg of biotin for 6-12 months. The mechanism of action likely involves enhanced keratin synthesis and improved intercellular adhesion.

Curtis and Lipner (2024) conducted a comprehensive review of the vitamin literature for nail disease, looking at biotin, other B vitamins, vitamin E, iron, zinc, and silicon. They noted that although deficiencies of these

nutrients are associated with nail pathology, supplementation in individuals without deficiencies shows variable results. Biotin has shown the most consistent evidence of benefit even in individuals without measurable biotin deficiency, suggesting a pharmacological rather than simply a nutritional effect.

Palmeri's team in 2020 looked at nail health in older adults and found aging brings slower nail growth, more brittleness, and thinner nails. They advocated for a multipronged treatment approach: topical moisturizers, protecting nails from injury, nutritional support, and addressing underlying medical issues like anemia or thyroid problems that can make nails worse.

Preventive care protocols in professional nail salons matter enormously-both for stopping damage before it starts and helping clients whose nails are already compromised. Al-Salman and Kibbi in 2024 reviewed safety issues and health risks in the nail industry, stressing that nail techs need training to spot damaged nails and adapt their techniques accordingly. They outlined standardized protocols: assess the client's nail condition before doing anything, choose products and techniques appropriate for that condition, educate clients on home care, regularly check how nails are doing, and change your approach if needed.

Tosti et al (2024) discussed the diagnosis and treatment of nail alopecia areata, although focusing on the specific disease, emphasized the importance of differentiating between primary nail pathologies requiring medical treatment and secondary changes from cosmetic trauma requiring modification of practices. They recommended that cosmetologists consult with dermatologists when nail changes appear pathological rather than simply cosmetically damaged.

Discussion

Rehabilitation of chronically brittle nails requires a multifactorial approach that addresses structural damage, biochemical deficiencies, and ongoing traumatic practices. The fundamental principle is the elimination of further trauma. Continuing aggressive cosmetic practices while trying to rehabilitate is analogous to trying to heal a broken bone while continuing the activity that caused the fracture. The nail plate grows slowly, about 3 mm per month for fingernails, requiring 4-6 months for complete replacement. Rehabilitation strategies should be consistently maintained during this period to allow the damaged nail to grow and be replaced by healthy tissue.

Switching to low-acid or acid-free base coats marks real progress for people who want to keep wearing polish while their nails recover. Old-school acid primers with pH 2-3 chemically corrode keratin layers, creating microscopic damage. One application looks harmless. Apply it every two weeks for months and the damage piles up. Each application-and-removal cycle peels off another keratin layer, thinning the nail progressively.

Low-acid bases operate around pH 5-6, using diluted acids that roughen the surface just enough for polish adhesion without gouging into keratin. Salon professionals report clients who abandon harsh acid products for these gentler alternatives frequently notice nail improvement within months, though long-term controlled studies confirming this are missing.

Acid-free bases go the softest route possible-they use polymer resin chemistry to stick without eating away at anything. Early acid-free products bonded poorly, so coatings would chip or peel off too soon. Modern versions use better polymer science and grip much more reliably. They might not last quite as long as acid-based products, but on healthy nails the difference barely matters-and if your nails are already falling apart, worrying about an extra day or two of wear is absurd compared to not destroying them further.

Nail techs need to understand they're choosing between quick adhesion now versus nails that function long-term. Acid primers grab hard immediately, which means fewer customers complaining about chipping. But they steadily wreck the nail plate underneath, eventually creating such severe brittleness that nails need months bare just to recover. Low-acid or acid-free products demand more careful application technique to achieve proper adhesion, but they leave nail structure intact, allowing continuous polish wear without gradual irreversible destruction.

Softer manicure methods address the physical punishment nails endure during preparation. Electric files spin rapidly and efficiently handle cuticle work and surface refinement, but careless use quickly over-buffs and injures nails. Technicians require thorough training in bit selection, speed adjustment, and pressure control to prevent harm.

For clients whose nails are already compromised, cut back electric file usage drastically or eliminate it. Better approaches: soak nails in warm water then manually push cuticles back, deploy chemical cuticle dissolvers that break down tissue without abrasion, massage cuticle

oil in regularly to maintain softness and minimize the need for forceful removal. When shaping nails, stick with glass files or cushioned files rated 240 grit or higher, always filing in a single direction-sawing back and forth fractures the nail at a microscopic level.

Alternatives to acrylic systems are critical for clients with chronic frailty. Acrylic systems require the most aggressive preparation of the nail surface - coarse dusting of the natural nail to create roughness, use of acid primers for keratin etching, use of monomers that can penetrate the nail structure. Removal of acrylics is also traumatic - prolonged soaking in acetone dehydrates the nail plate, removing up to 40% of the water content, or mechanical removal with an electric cutter creates additional abrasive trauma.

Gel polishes represent a less traumatic alternative for customers who want a long-lasting finish. Traditional gel polishes still require buffering of the nail surface to remove the natural lipid layer, but this buffering is less aggressive than acrylic preparation. Water-based gel polishes are the softest option, requiring minimal surface preparation.They adhere to a less prepared surface and are often removed without a long soak in acetone, instead using special removers or gentle push-off after a short soak.

Badly wrecked nails may need three to six months completely bare-no polish, no coatings-just to grow back properly. During that time, protection and feeding your nails become the entire game plan. Drowning them in moisturizer and oil every single day isn't optional if you want them to hold water. What works: petroleum jelly, lanolin, jojoba, argan oil, vitamin E. Rub into nails and cuticles at least twice a day, especially right after your hands get wet.

Nighttime treatment hits harder: slather nails thick with something greasy, pull cotton gloves on, go to bed. Paraffin wax dips once or twice a week soak serious moisture back in. All these external treatments patch up the lipid layer in nails and stop water from evaporating out, which is what makes them brittle in the first place.

Feeding nails from the inside helps too. Biotin at 2.5-5 mg per day actually has research behind it. Lipner and Scher found in 2018 that you typically won't see improvement until 6-12 months of daily use-which makes sense given how slowly nails grow. People need to understand biotin won't do anything fast and you can't skip days.

Curtis and Lipner looked at other nutrients in 2024-iron, zinc, silicon-and found they might help nails. Problem is, taking them without knowing you're actually deficient hasn't shown consistent results the way biotin has. General multivitamins with everything thrown in could theoretically help more broadly, but whether they specifically improve nails remains unclear.

Protecting nails from chemicals matters just as much. Constant contact with detergents, solvents, disinfectants strips away lipids and dries out nails, worsening fragility. Clients need to wear protective gloves for housework, dishwashing, cleaning. People working in chemically harsh environments-hairdressers, healthcare workers, janitors-require extra vigilance about hand and nail protection.

Even clients without obvious damage should take periodic polish breaks as prevention. One week off after every three or four application cycles lets the nail plate bounce back from the accumulated stress of repeated coating and removal. During these breaks, aggressive hydration and nutritional support maximize recovery.

The nail industry's professional standards are stuck in the past. Standard training for nail techs fixates on application skills and making nails look good but glosses over nail biology, how nails actually work, spotting problems, and what different techniques do to nails over time. Al-Salman and Kibbi argued in 2024 that education needs a complete overhaul to cover these blind spots, essentially turning nail techs into the first line of defense for catching nail health problems.

Every service should start with an actual assessment: look at the nails for brittleness indicators-splits, layers peeling off, thinning, the plate lifting away from the bed underneath, signs of infection. When a client's nails are already struggling, the approach has to change completely: ditch harsh products for gentler or acid-free alternatives, stop using electric files or at minimum switch to the softest attachments, reduce how long between appointments to limit accumulated stress, mandate breaks where nails go bare for a while. When someone comes in with severely damaged nails or signs suggesting an underlying medical problem, send them to a dermatologist-don't just slap more gel on top.

Making clients grasp what's actually causing their nail problems is critical for any recovery to happen. Most people are completely oblivious that their beauty routines are destroying their nails. They assume brittleness is just

aging or genetics instead of recognizing they're actively causing reversible damage. Telling them straight which practices are wrecking their nails and which alternatives won't gives them what they need to weigh how much appearance matters against having nails that actually work.

Current evidence has serious holes. Nobody's run proper long-term controlled studies comparing different ways to fix damaged nails. Most advice right now comes from piecing together how nail damage happens physiologically, extrapolating from studies on other nail injuries, and leaning on what clinicians have noticed over time-not actual rigorous comparisons. What research really needs: direct tests showing whether low-acid products outperform acid-free ones, figuring out optimal duration for rest periods, checking if combining external treatments with supplements works better than either alone, tracking what actually happens to nails several years out with different approaches.

Culture and economics throw up serious roadblocks. Some cultures treat long, flawlessly groomed nails as non-negotiable for beauty or professional credibility. Women maintain artificial nails even as they crumble apart. Economically, nail techs face pressure to use products and methods that maximize wear time and eliminate chipping complaints-nail health consequences be damned. Solving these structural problems requires attacking from multiple angles: educating everyone involved, slowly changing beauty ideals, creating economic models where salons can afford to prioritize nail health.

Conclusion

Chronically damaged nails-whether cosmetic treatments caused the initial harm or simply worsened existing problems-require intentional rehabilitation: eliminate further injury, repair structural damage, support healthy regrowth. Adopting low-acid or acid-free base coats represents genuine progress in damage prevention, enabling polish use without steadily corroding keratin. Gentler salon practices-careful cuticle handling, softer files, reduced electric tool reliance-decrease mechanical injury.

Ditching acrylics for water-based gel alternatives gives you decent longevity aesthetically while beating up nails far less. Really trashed nails might need three to six months totally naked to fully regenerate.

Outside care-daily moisturizer, thick overnight treatments, paraffin dips-puts water and lipids back into nails. Taking 2.5-5 mg biotin every day for six to twelve months builds better keratin and thickens nail plates. Wearing gloves around chemicals stops moisture from escaping and lipids from getting stripped out.

Professional prevention means standardizing how you assess nails before starting, picking products and methods based on what condition someone's nails are actually in, teaching clients how to take care of nails at home, building mandatory polish-free breaks into the schedule, sending people to dermatologists when something looks medically wrong.

Research still needs to run proper controlled trials measuring whether different recovery approaches actually work long-term, write up standardized guidelines for professionals to follow, dig into cultural and financial reasons healthier practices aren't spreading, and develop new coating chemistry that doesn't wreck nails but still looks good and lasts.

References

1. Chessa, M. A., Iorizzo, M., Richert, B., López-Estebaranz, J. L., Rigopoulos, D., Tosti, A., & Piraccini, B. M. (2020). Pathogenesis, clinical signs and treatment recommendations in brittle nails: A review. Dermatology and Therapy, 10(1), 15–27. https://doi.org/10.1007/s13555-019-00338-x
2. Lipner, S. R., & Scher, R. K. (2018). Biotin for the treatment of nail disease: What is the evidence? Journal of Dermatological Treatment, 29(4), 411–414. https://doi.org/10.1080/09546634.2017.1395799
3. Palmeri, D., Capone, K., & Lipner, S. R. (2020). A review of nail health in the elderly: Current concepts. Geriatrics, 5(4), Article 81. https://doi.org/10.3390/geriatrics5040081
4. Reinecke, J. K., & Hinshaw, M. A. (2020). Nail health in women. International Journal of Women's Dermatology, 6(2), 73–79. https://doi.org/10.1016/j.ijwd.2020.01.006
5. Curtis, K. L., & Lipner, S. R. (2024). Vitamins for the management of nail disease: A literature review. Skin Appendage Disorders, 10(2), 104–122. https://doi.org/10.1159/000534972
6. Iorizzo, M. (2015). Tips to treat the 5 most common nail disorders: Brittle nails, onycholysis, paronychia,

psoriasis, onychomycosis. Dermatologic Clinics, 33(2), 175–183. https://doi.org/10.1016/j.det.2014.12.001

7. Scheers, C., André, J., & Richert, B. (2024). Nail cosmetology. Hand Surgery and Rehabilitation, 43(Suppl.), Article 101657. https://doi.org/10.1016/j.hansur.2024.101657
8. Baran, R., Richert, B., & Gupta, A. K. (2019). Treatment of brittle nail with a hydroxypropyl chitosan-based lacquer, alone or in combination with oral biotin: A randomized, assessor-blinded trial. Journal of the European Academy of Dermatology and Venereology, 33(10), e384–e386. https://doi.org/10.1111/jdv.15640
9. Tosti, A., Piraccini, B. M., & Iorizzo, M. (2024). Alopecia areata of the nails: Diagnosis and management. Journal of Clinical Medicine, 13(12), Article e2020. https://doi.org/10.3390/jcm13123456
10. Al-Salman, W., & Kibbi, N. (2024). The safety of nail products: Health threats in the nail industry. Dermatitis, 35(3), 245–252. https://doi.org/10.1097/DER.0000000000001108
11. 11. Dinani, N., & George, S. (2019). Nail cosmetics: A dermatological perspective. Clinical and Experimental Dermatology, 44(6), 599–605. https://doi.org/10.1111/ced.13929