# Family Doctor

*A Journal of the New York State Academy of Family Physicians*

NEW YORK STATE ACADEMY *of* FAMILY PHYSICIANS

Summer 2025

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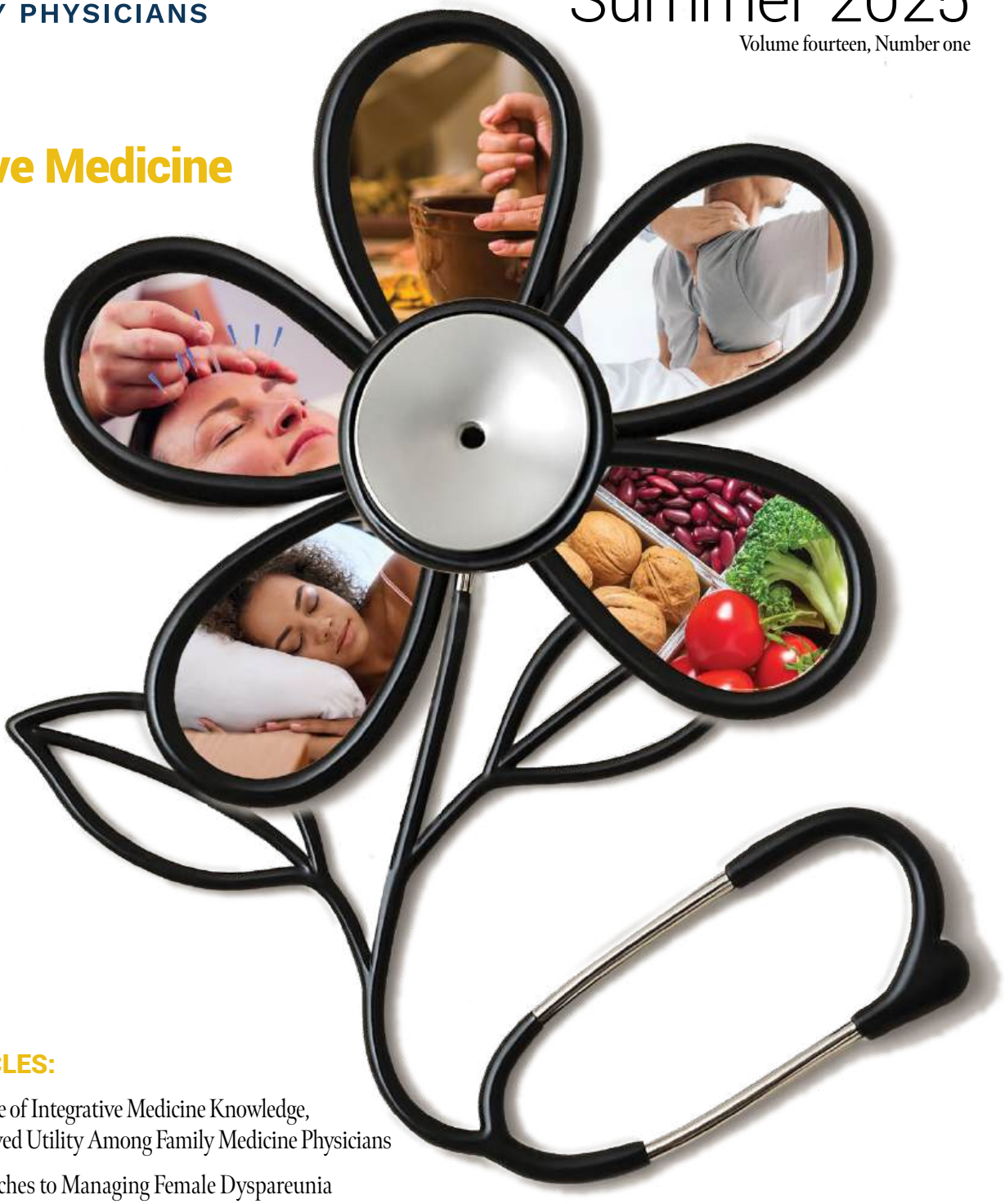
*Focus:*

## Integrative Medicine



### FEATURE ARTICLES:

- Analyzing the Scope of Integrative Medicine Knowledge, Practice, and Perceived Utility Among Family Medicine Physicians
- Integrative Approaches to Managing Female Dyspareunia
- A New Frontier for an Old Medicine: Acupuncture in the Treatment of Long COVID
- Curcumin for Depression and Anxiety: A Narrative Review of Current Clinical Evidence
- Integrative Medicine Approach to Sleep Optimization: A Toolkit for Primary Care

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**Editor:** Penny Ruhm, MS



# Articles



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# From the Executive Vice President

By Vito Grasso, MPA, CAE

After 32 years as EVP of NYSAFP, I have mixed emotions about our health care system.

I have met and worked with many amazing physicians. Competent, compassionate and dedicated to helping patients. If the physicians I have known were the only measure of quality and capability of our health care system, then I would have no reservations about the future of health care in the US.

My professional exposure to our health care system and the medical profession has been supplemented by my own experience as an advocate and caregiver for my daughter who was diagnosed 15 years ago with neurofibromatosis-2. She has endured 13 surgeries and has participated in two major drug trials and several research studies to assess the impact of NF on her mental state and outlook on life. She is followed by several specialists, takes multiple medications, requires constant scans and tests, and must deal with the incredible complexities and frustrations of the health care and medical research bureaucracies.

My experience as an advocate for NF2 research and support for NF2 patients has also introduced me to many remarkable clinicians, researchers and NF families. My interaction with other NF families has involved numerous shared experiences. Many of those shared experiences have reinforced positive impressions of the capabilities of our health care system and our medical research sector and the people who are engaged in patient care or research. Other experiences, however, have exposed both deficiencies in our health care and medical research systems, and shortcomings in some people who work in healthcare.

The administrative environment of health care is patient adverse, inefficient and often callous. The political environment in which the legal and regulatory parameters within which the system must work, is unreliable and unstable. While the current system is replete with deficiencies, the Trump administration seems obsessed with tearing it down without a plan for how to replace it. Both NYSAFP and AAFP have expressed reservations about the direction the department of Health and Human Services (HHS) is heading. The decision by Secretary Kennedy to replace everyone on the Advisory Committee on Immunization Practices (ACIP ) confirms some of the worst fears of public health advocates.

Indeed, what is happening at HHS is entirely consistent with the disruption generally that is the hallmark of the Trump administration. In his first term, President Trump was focused on overturning the Affordable Care Act (ACA). He was frustrated in his attempts to do so because he did not offer an alternative. Health care is complicated, especially in a multi-payer system in which clinical services are considered commodities and the influence of bottom-line oriented companies grows every day. There are no easy fixes to the myriad of problems in health care and the first iteration of the Trump administration was simply incapable of engineering a better alternative.

The 2024 election was a mandate for change, not necessarily an endorsement of the President, but rather a reflection of years of frustration by voters all along the ideological spectrum with the abysmal performance of government under a two-party political system which has elevated partisanship above principle and common sense. It is discouraging to look ahead whether in health care or elsewhere along our political landscape. Slim Republican majorities in Congress and divisions within both major political parties will perpetuate the intransigence and stalemate we have been burdened with for a quarter century or more.

My ambivalence about the future of health care is certainly rooted in the frustration I share with many Americans regarding the unreliability of our political process. The pernicious effect of the corporatization of healthcare cannot be reversed without sound public policy and investment of significant public resources. When taking measure based on the most recent demonstration of political discretion by the American electorate, it is discouraging to imagine that we will soon produce the quality of leadership needed to correct course.

*Health care is complicated, especially in a multi-payer system in which clinical services are considered commodities and the influence of bottom-line oriented companies grows every day.*

## Upcoming Events

### 2025

**Downstate Regional Family Medicine Conf NYU Langone**
September 13

**Resident Meet & Greets**
September 24 - Long Island
September 25 - NYC/Bronx/Westchester
September 30 - Syracuse
October 15 - Rochester
October 16 - Buffalo/Erie
October 21 - Southern Tier
October 22 - Capital District
October 29 - Virtual Career Fair

**Virtual Commission Meetings**
October - TBD

**Virtual Board Meeting**
November 2

### 2026

**Winter Weekend at Hilton Saratoga Springs**
January 16-18, 2026

# Save the Date

## Winter Weekend & Scientific Assembly

**January 16 – 18, 2026**
**Saratoga Springs**


# President's Post

By Christine Doucet, MD

I am deeply honored to serve as the 79th President of this incredible organization – an Academy that represents the very heart of healthcare across our great state. I hope that you will enjoy my first input into our amazing journal!

I want to talk about an exciting opportunity — one that could shape the future of healthcare in our communities for decades to come. It's about connecting students with family medicine doctors early, and sparking an interest in family medicine long before college. Early exposure can plant the seed for a lifelong passion. It can help students see family medicine not just as a career, but as a calling. If we invest in these connections now, maybe we can inspire the next generation of caring, community-focused physicians — exactly the kind of leaders our healthcare system needs.

Family medicine is the foundation and the heart of our healthcare system. It touches every stage of life, from newborn checkups to caring for our aging loved ones. It is where relationships are built, where preventive care begins, and where healing happens in the context of a patient's whole life — their family, their environment, and their community, and yet, too often, young people don't discover its importance. Why? Because exposure to family medicine often comes too late. By the time students reach medical school, many have already chosen their specialties based on what they've seen — and family medicine is often overlooked. And, despite family medicine's critical importance, we face a growing shortage of family physicians across the country.

I want to propose something simple but powerful: let's start earlier. Imagine the impact if we introduced family medicine not just in high school, but also in middle school and even elementary school. Through school visits, we can show students — at every age — what it means to care for people throughout their lives. We know that early exposure influences life choices. Research shows that interests developed in high school can strongly influence career choices. The earlier we plant the seed, the more we inspire a passion for healing, for helping, and for serving communities.

A student who meets a family doctor at age 10, 12, or 16 may begin to imagine their future differently — seeing that medicine isn't only about hospitals and emergencies, but about long-term relationships, prevention, and trust. Imagine if students were introduced to family medicine in high school — not just through textbooks, but through real experiences: shadowing doctors, volunteering at clinics, listening to family physicians share their stories, and engaging in mentorship programs that reveal the true impact and depth of this career. Even more, imagine planting those seeds of curiosity in middle school — or even in elementary school — through career days, field trips, or simple hands-on activities that show what it means to be a doctor who knows the whole family, who treats the whole person.

Imagine students discovering, during some of the most formative years of their lives, a calling to be healers, advocates, and leaders in their communities. We can spark an early interest in family medicine. We can show young people that family physicians do more than treat illness; they build relationships, promote wellness, and strengthen entire communities. We can invite family doctors into classrooms to share their stories, demystify the profession, and inspire students with the personal satisfaction and societal impact that comes with being a family physician.

Family medicine isn't just a job — it's a lifelong commitment to making a difference. It's a commitment to caring for people at every stage of life. By connecting students with family physicians now, we can open their eyes to a world where they can make a lifelong difference — not just treating illnesses, but promoting wellness, preventing disease, and serving families across generations. Let's show our young people that this path is not only possible, but profoundly meaningful.

Together, by bridging students, especially high school students and family medicine early, we can cultivate and guide them to see family medicine as a meaningful, exciting path. Let's show students, from the youngest to the oldest, that family medicine isn't just a career path — it's a chance to make a lasting difference in people's lives. And maybe we can get a new generation of compassionate, skilled, and community-focused physicians. The future of healthcare depends on it — and the future is already sitting in our classrooms.

Thank you.

Respectfully,
*Christine M. Doucet, MD*

# Albany Report

By Reid, McNally & Savage

## June 23, 2025

The regularly scheduled 2025 legislative session in New York concluded with the Senate adjourning Friday, June 13th early in the morning while the Assembly worked through the following week, gaveling out just after midnight on June 18th. In total, over 850 individual bills were passed by both houses during the 2025 legislative session out of approximately 16,750 bills introduced since the session started in January. Passed bills will now need to be transmitted to Governor Hochul's desk before the end of the year for her to sign, veto or seek chapter amendments for. All bills not passed this year will remain live for the 2026 legislative session.

Many issues dominated state discussions this session including prison reform after the killing of two inmates by New York State corrections officers, artificial intelligence regulation, enabling out-of-state athletic trainers traveling with their sports teams to work in New York State in advance of the FIFA World Cup in 2026, and others. A large focus throughout was the highly anticipated New York City mayoral primary taking place on June 24th as well as the proposed federal cuts under consideration in Washington D.C. which leaders agreed to not address until they become a reality.

Lawmakers have now returned to their districts and at this point, all signs point to a return of the Legislature in September to handle the aforementioned loss of potentially $13 to $20 billion in federal aid for New York, with the biggest cuts affecting the State's Medicaid program and General Fund, and food stamps (SNAP). Legislators would then come back as scheduled to Albany in January 2026 when the next session begins.

Below is a summary of positive outcomes for the SFY 2026 final state budget and NYSAFP's advocacy efforts on priority bills on behalf of its members and the patients family physicians serve.

## Final State Budget Achievements

- $50 million provided for Managed Care Organization (MCO) Tax Physician Fee Schedule Increases
- $15.865 million in full funding for Doctors Across NY
- $2.7 million in funding for Area Health Education Centers (AHEC); An additional $500,000 from previous years
- Physician Assistant Scope of Practice Expansion Rejected
- Physician Excess Medical Malpractice Program Restructuring Rejected and Program Extended through June 30, 2026
- Transfer of Oversight from State Education Department to Health Department Rejected
- Exclusion of Medicaid from Independent Dispute Resolution Rejected
- Abortion Access and Reproductive Healthcare Infrastructure Funding:
  - $25 million for the Reproductive Freedom and Equity Grant program to expand capacity and ensure access for patients

- $4 million for additional services and expenses for state grants for abortion access to support abortion clinical training programs
- $1 million for additional services and expenses for abortion access; available for payment to support grants for access to essential care
- $20 million for services and expenses for abortion service providers, including costs associated with medication abortion care
- $5 million for additional services and expenses for abortion service providers, including costs associated with medication abortion care and available for payment to support grants for access to essential care
- $15 million for capital projects at reproductive health facilities, including support for infrastructure improvements, modernization, safety and security

- Included a proposal to clarify that pregnancy loss reporting is not necessary under New York State law unless requested by the patient to protect the identity and of individuals who suffered a pregnancy loss

## Medical Aid in Dying (MAID) Passed By the State Senate and Assembly

This year marked ten years since the introduction of MAID legislation in New York, 7 years during which the Academy has been a part of advocacy efforts. The momentum over these years along with the Academy's support and media efforts with the MAID Alliance Coalition, as well as Academy members' annual advocacy, brought MAID to the finish line. The shift was also likely related to the many newly-elected legislators joining the Assembly this year and the delayed state budget. The window of time in which legislators were largely waiting on leadership budget negotiations gave the Assembly the needed opportunity to debate and ultimately pass the bill, with Assemblymember Paulin explaining and defending the legislation for 4 hours, the maximum time allowed. The Assembly passed the legislation 81-67 with all Republicans and Assembly members Berger, Bichotte, Hermelyn, Buttenschon, Conrad, Eichenstein, Fall, Lucas, Magnarelli, Peoples-Stokes, Pheffer Amato, Santabarbara, Solages, Vanel, Walker, Weprin, Wieder, Williams, Yeger, and Zaccaro in the majority conference voting against the bill.

Following passage in the Assembly, the Senate Majority Leader stated publicly for the first time that she would engage with her conference to be sure of support and bring the bill to the floor for debate and a vote. Ultimately, in the last week of the legislative session, following a two-hour debate, the Senate passed the bill 35-27 with all Republicans and Senators Baskin, Bynoe, Cleare, Martinez, and Persaud in the majority conference voting against the measure.

We were proud to be asked by the bill sponsors, AM Paulin and Senator Hoylman-Sigal, if the Academy would join them at press conferences urging passage in each house. Dr. Rachelle Brilliant, Immediate Past President, joined other legislators in support, with several other organizations to advocate for the bill. We also want to recognize Dr. Heather Paladine, Past President, for all of her leadership and advocacy on this measure which contributed significantly to its success. Following the legislation's passage in both houses, we have already weighed in with the Governor and her counsel to urge for the bill to be signed as soon as possible. We will also be requesting a meeting with Governor Hochul and issuing a grassroots alert (and potentially additional in the future) for Academy members to echo our request for quick enactment.

## Legislation to Extend Further Protections to Families and Clinicians of Young People Receiving Gender-Affirming Care in New York State Passed Both Houses

In collaboration with the NY Civil Liberties Union, the NYS Psychiatric Association, and many other organizations, NYSAFP members joined RMS in meetings to urge lawmakers to pass this important legislation (S4914B/ A5480) that would strengthen the gender-affirming care shield law signed into law last year.

After amendments were made to the bill to strengthen it in light of developments related to the new federal administration, and to ensure prior leadership concerns were addressed, the Senate passed the legislation in May and the Assembly followed suit in the final days of session. A special thanks to Dr. Scott Hartman for mobilizing people among his networks to make calls and send emails in support!

## Physician Assistant Independent Practice Defeated

Several bills were again introduced this session that would eliminate supervision requirements for physician assistants (PAs). A.7988, Paulin/ S.7981, Rivera would have eliminated supervision requirements for PAs with 6,000 practice hours and those practicing in primary care or hospital settings. A.5130 would have broadly authorized PAs with 3,600 practice hours to practice without supervision.

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These bills, along with the recurring proposal by Governor Hochul in her Executive Budget to remove physician supervision of PAs, were one of the main priorities on NYSAFP's annual Advocacy Day at the NYS Capitol on February 24th, 2025. A record number (63 participants) of physicians, residents, and students met with their legislators to share their experiences and urge rejection of these initiatives.

However, in part due to the passing of legislation last year that expanded the ratio of PAs that a physician can supervise, and our continued work and collaboration throughout this year's budget process and legislative session, **ultimately neither of these bills advanced and PAs were not granted independent practice**. It seems clear that the Legislature recognizes the many risks of granting PAs independent practice, and most importantly, patient safety being jeopardized.

## "Wrongful Death" Bill Passed Both Houses

As expected, this bill (S4423/ A6063), vetoed three times now by Governor Hochul, was passed by the Legislature in the final weeks of session. While amended from last year's version, there were no significant changes made. This legislation still authorizes an award in a wrongful death action to include compensation for grief or anguish, the loss of services, support, and inheritance, and the loss of nurture and guidance and would have significant adverse impact to New York's healthcare system.

Academy members opposed this measure at the annual Advocacy Day, voicing already high malpractice liability costs and concerns about having to leave New York for other states to be able to continue practicing, sending nearly 30 sent messages to their legislators urging opposition at the end of session. We will work with MSSNY, other specialty societies, business groups, hospitals, and others to ask the Governor to again veto the bill, in addition to other potential efforts like an advertising campaign and an action alert, prior to the bill being sent to her desk.

## Congressman Paul Tonko Attended COD in May

On Saturday, May 17th, US Representative Paul Tonko, representing New York's 20th Congressional District, addressed attendees at NYSAFP's annual Congress of Delegates in Albany. He discussed his priorities in Congress, work he is doing to support Americans struggling with addiction and mental illness, and provided valuable advice on what Academy members can do in the face if proposed federal cuts to Medicaid.

## Legislation of Interest Passed by Both Houses

Summaries of bills that passed both the Senate and Assembly this session, and are of particular interest to NYSAFP are reviewed below. These pieces of legislation will now need to be transmitted to Governor Hochul's desk before the end of the year for her to sign into law, veto, or seek chapter amendments for. We will also soon be sharing our comprehensive health/mental hygiene summary of bills spanning several sectors such as hospitals/institutional care, health professions, public health, insurance, and more that passed both houses this session.

**Prohibiting Prior Authorization for Certain HIV Medications (A26, Rosenthal/ S5534, Hoylman-Sigal)**
This bill amends the public health law to prohibit Medicaid service providers from requiring prior authorization for antiretroviral prescription drugs for the treatment or prevention of HIV or AIDS.

**Insurance Coverage for Inhalers (A128-A, Gonzalez-Rojas/ S1804-A, Rivera)**
This legislation amends the insurance law to require insurance coverage for one rescue and one maintenance inhaler and would not be subject to a deductible, copayment, coinsurance, or any other cost-sharing requirement.

**Medical Aid in Dying (MAID) Act (A136, Paulin/ S138, Hoylman-Sigal)**
This bill amends the public health law to allow a terminally ill, mentally capable adult with a prognosis of six months or less to live to request a prescription for medication that they can take to bring about a peaceful death at a time of their choosing, should they decide to use it.

**Hospital Violence Prevention Program (A203-B, Cruz/ S5294-B, Sepulveda)**
This legislation amends the public health law to require hospitals to establish a violence prevention protection program including the establishment of security personnel in hospital emergency departments to protect the verbal and physical abuse of doctors, nurses and staff who provide critical medical care in emergency departments.

**Clarifying Changes to Requiring Insurance Contracts to Cover Neuropsychological Examinations for Dyslexia (A419, R. Carroll/ S756, Hoylman-Sigal)**
This bill is a chapter amendment to clarify that neuropsychological screenings that are already required to be covered by insurance contracts, must be performed by a licensed healthcare professional acting within the scope of their practice upon the referral of a physician. It also makes technical changes to clarify that screenings can be subject to utilization review and a plan's participating provider network. This bill was signed into law on 2/14/25, chapter 8 of the laws of 2025 and took effect retroactively on January 1, 2025.

**Relates to Step Therapy Protocol (A443, McDonald/ S2676, Bailey)**
This legislation is a chapter amendment to make clarifying technical changes in requiring a utilization review agent to follow certain rules when establishing a step therapy protocol, and move the effective date to January 1, 2026. This legislation was signed into law on 2/14/25, chapter 20 of the laws of 2025 and took effect immediately.

**Intrauterine Device Informational Pamphlet (A778-A, Rosenthal/ S7714-A, Gonzalez)**
This bill amends the public health law to direct the Department of Health (DOH) to create an informational pamphlet concerning intrauterine devices which would be required to be available on the DOH website. It would also require practitioners to distribute the informational pamphlet to patients seeking contraceptives.

**Personal Identifying Information (A920, Lavine/ S785, Persaud)**
This legislation is a chapter amendment in relation to a bill requiring that medical information and health insurance information be added to the penal law for offenses involving theft of identity to remove medical information and health insurance information to the crimes of identity theft in the third degree, identity theft in the second degree, and identity theft in the first degree because those terms are included in the definition of personal identifying information. It would also make technical changes to definitions. This bill was signed into law on 2/14/25, chapter 30 of the laws of 2025 and took effect on May 15, 2025.

**Physician Profile Information (A926, McDonald/ S769, Rivera)**
This bill is a chapter amendment in relation to legislation regarding the submission of physician profile information to clarify provisions related to requiring DOH to update information on physicians' health plan participation and allowing certain professionals to update physician profiles on the DOH website. This bill was signed into law on 2/14/25, chapter 34 of the laws of 2025 and took effect immediately

**Doula Access During Emergency Situations (A1019, Solages/ S758, Persaud)**
This legislation is a chapter amendment in relation to a bill providing that maternal health care facilities are not required to grant doula access during emergencies or when such access could compromise the safety of the patient or health care team, to clarify provisions related to allowing a birthing person to designate a doula to access them upon admission to a hospital or freestanding birthing center for care, and prohibiting these facilities from denying a birthing person access to their designated doula. This bill was signed into law on 2/14/25, chapter 39 of the laws of 2025 and took effect on May 15, 2025.

**Maternal Depression Screenings (A1025, Solages/ S802, Brouk)**
This bill is a chapter amendment in relation to legislation requiring the DOH Commissioner to consult with the Office of Addiction Services and Supports to publish certain guidance on maternal depression screenings, to require the DOH Commissioner to consult with the Office of Addiction Services and Supports in addition to the Office of Mental Health and other stakeholders in identifying and publishing existing guidance for providers on incorporating maternal depression screenings into routine care. The chapter amendment also makes technical changes. This bill was signed into law on 2/14/25, chapter 42 of the laws of 2025 and will take effect on August 13, 2025.

**Patient Drug Use Reporting (A1894, Paulin/ S3362, Rivera)**
This legislation repeals section 3372 of the public health law to remove the requirement that an attending or consulting practitioner report to the DOH Commissioner a person's name, address, and other data as required, if a person under treatment is found to be an addict or a habitual user of any narcotic drug.

**Episiotomy Information (A2168, Paulin/ S7545, Brouk)**
This bill amends the public health law to require DOH to develop, and maternal health care providers to distribute, written information about the risks associated with episiotomies to maternity patients.

**Breast Cancer Screenings for Incarcerated Individuals (A2250, Torres/ S768, Cleare)**
This legislation is a chapter amendment in relation to a bill requiring incarcerated individuals with access to breast cancer screening and information about breast self-examinations, to ensure that breast cancer screening and diagnostic testing offerings were responsive to physician recommendations and in accordance with national recognized clinical practice guidelines. This legislation was signed into law on 2/14/25, chapter 67 of the laws of 2025 and will take effect on August 13, 2025.

**Still Birth or Pregnancy Loss Certificate Fee (A2311-A, Zaccaro/ S1807-A, Fernandez)**
This bill amends the public health law to prohibit charging a fee for the issuance of a certificate of still birth or pregnancy loss.

**Reproductive Health Services Education and Outreach Program (A2581-A, Gonzalez-Rojas/ S3285-B, Gonzalez)**
This legislation amends the public health law to create a DOH Education and Outreach Program on reproductive health services for consumers, patients, educators, and health care providers related to reproductive health services available in New York State including, but not limited to: access to family planning services such as contraceptives and pregnancy testing, testing and treatment for sexually transmitted infections, and any other health conditions or information the DOH Commissioner deems necessary. Other required information includes counseling, telehealth services, and financial assistance available through state agencies, complications from pregnancy that can endanger the life or health of the newborn or mother, and the symptoms risks, transmission, and prevention of cytomegalovirus and the effects of such virus.

**Out-of-State Licensed Athletic Trainers (A2643-A, Solages/ S5275-A, Bailey)**
This bill amends the education law to permit certain licensed athletic trainers who are licensed to practice in another state, territory, or country to provide athletic training services to athletes and team personnel at a discrete sanctioned team sporting event or performance in New York State.

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**Transvaginal Ultrasounds (A3280-A, Bichotte Hermelyn/ S3323-A, Scarcella-Spanton)**
This legislation amends the insurance law to require insurance policies to provide coverage for transvaginal ultrasounds during pregnancy.

**Use of Virtual Credit Cards by Insurers and Certain Health Care Plans (A3986-A, Bores/ S2105-A, Cooney)**
This bill amends the insurance and public health laws to allow the use of alternative payment methods for claims including credit card, virtual credit card, or electronic funds transfer that impose on the provider a free or similar charge to process the payment. The insurer would be required to first notify the patient provider of the potential fees or charges, offer the provider an alternative payment method that does not impose fees or charges, and allow the provider or a designee to elect to accept such payment type. It also establishes that an election to accept or not accept a specific type of payment shall remain in effect until it is changed and requires an insurance carrier to seek permission to charge a fee solely to transmit a payment to a provider.

**Prescription Labeling for Mifepristone or Misoprostol (A5285, Reyes/ S4587, Mayer)**
This legislation is a chapter amendment in relation to a bill permitting prescription labels for mifepristone, misoprostol, and their generic alternatives to include the name of the prescribing health care practice instead of the name of the prescriber, at the prescriber's request to make technical clarifying changes. This legislation was signed into law on 3/20/25, chapter 108 of the laws of 2025 and took effect immediately.

**Cost Sharing Requirements (A5367-A, Weprin/ S6895-A, Bailey)**
This bill amends the insurance law to clarify that if the application of any cost-sharing requirements adopted by the State for health insurance plans, policies, and coverages would prevent health savings account (HSA)-qualified plans from meeting the requirements under federal law (26 USC 223), the relevant requirement would only apply to HSA-qualified plans after the federal required minimum deductible has been met. However, this exception would not apply to items or services considered "preventive care" by the IRS under federal law. The purpose of this legislation is to ensure that consumers, insureds/enrollees, and HSA owners can continue to fund their HSAs to pay for qualified medical expenses on a tax-advantaged basis.

**Medical Malpractice Insurers (A6595, Weprin/ S7221, Bailey)**
This legislation amends the insurance law to extend the risk-based capital requirements of Insurance Law 1324 for those stock and non-stock insurers to which 1324(b)(2)(B) applies until 12/31/28. It would also extend the prohibition on making an application for an order or rehabilitation or liquidation of a domestic insurer.

**Amyotrophic Lateral Sclerosis (ALS) and Motor Neuron Disease (MND) Registry (A7845, Stern/ S6413, Scarcella-Spanton)**
This bill amends the public health law to require DOH to establish a registry for the collection of information on the incidence and prevalence of ALS and MND in NYS. Every physician, nurse practitioner, physician assistant and general hospital that diagnoses or treats a patient diagnosed with ALS or MND would be required to give notice to the DOH of cases of ALS or MND coming under their care and requires that patients diagnosed with ALS or MND be provided with written and verbal notice regarding the collection of information and patient data on ALS and MND. It also provides patients with the right to opt-out of the collection of data.

**Expansion of Several Home Care Services (A7907, Seawright/ S7077, Cleare)**
This legislation amends the elder law to modify the Expanded In-Home Services for the Elderly Program (EISEP) to eliminate the cost share requirement for EISEP services and to eliminate any requirement for the Area Agencies on Aging (AAAs) to obtain a physician's order to provide non-medical support under EISEP funding.

**Assessment-Based Treatment Plans (A8045, Bronson/ S7622, Brouk)**
This bill amends the education law to authorize licensed mental health counselors, marriage and family therapists, and psychoanalysts to engage in diagnosis and the development of assessment-based treatment plans. It would also allow these mental health practitioners currently working in certain settings, as defined by SED in regulations, provided that such settings shall not include a private practice owned or operated by the applicant, to continue to diagnose through June 24, 2027. This legislation was signed into law on 6/20/25, chapter 140 of the laws of 2025 and took effect immediately.

**Prescription Labeling for Mifepristone or Misoprostol (S36-A, Mayer/ A2145-A, Reyes)**
This legislation amends the education law to permit prescription labels for mifepristone, misoprostol, and their generic alternatives to include the name of the prescribing health care practice instead of the name of the prescriber at the prescriber's request. This legislation was signed into law on 2/3/25, chapter seven of the laws of 2025 and took effect immediately.

**Medical Debt Definition (S753, Rivera/ A427, Paulin)**
This bill is a chapter amendment in relation to legislation that exempts credit card debt from the definition of medical debt unless the credit card is issued under an open- or closed-ended plan offered specifically for the payment of health care services, products, or devices provided to a person to clarify that the intent of is for human-based medical care, and does not include non-human care. This legislation was signed into law on 2/14/25, chapter 78 of the laws of 2025 and took effect immediately.

**Epinephrine Auto-Injector Coverage (S760, Rivera/ A2443, Yeger)**
This legislation is a chapter amendment in relation to a bill that requires health insurance plans to provide coverage for epinephrine auto-injector devices to specify that such coverage may be subject

to the plan's annual deductible. This legislation was signed into law on 2/14/25, chapter 81 of the laws of 2025 and takes effect on January 1, 2026.

**Health Information Protection**
**(S929, Krueger/ A2141, Rosenthal)**
This bill amends the general business law to create a legal framework for New Yorkers to reclaim and retain control of their healthcare information by requiring electronic apps or websites that provide a diagnosis or retain health information to receive affirmative consent by the user to retain such information. Electronic apps or websites would also be required to provide users the ability to rescind such consent.

**General Hospital Closure Notice**
**(S1226, Rivera/ A6004, Simon)**
This legislation amends the public health law to require public notice and public engagement when a general hospital seeks to either close entirely or close a unit that provides emergency, maternity, mental health, or substance use care no later than 270 days before the proposed closure date, and requires hospitals to confer with DOH prior to giving written notice. DOH would then be required to hold a public community forum to obtain public input no later than 30 days after to 150 days before the proposed closure and revised unit closure plans addressing community concerns, which must be submitted by the hospitals within 30 days after the forum.

**Tick-Borne Illnesses Report**
**(S1786, Hinchey/ A6047, Schiavoni)**
This bill amends the public health law to require DOH to develop annual reports on tick-borne illnesses which must be available on their website and requires the superintendent of the Department of Financial Services to review the status of health insurance coverage for the treatment of Lyme disease and other tick-borne related diseases.

**Medical Use of Cannabis**
**(S3294-A, Cooney/ A4759-A, Peoples-Stokes)**
This legislation amends the cannabis law to update the medical cannabis program to remove the requirement that medical cannabis practitioners consult the prescription monitoring system; provide the cannabis control board authority to allow practitioners to provide patients with a QR code, or similar tool to obtain medical cannabis; provide that certifications are valid for two years; allow practitioners to extend certain certification expirations; and provide that practitioners must complete appropriate training as determined by the board in regulation. It would also replace registry identification cards with a system for validating medical cannabis certifications and provide medical cannabis reciprocity with other states, territories, and the District of Columbia.

**Digital Health Service Platforms**
**(S3355-A, Rivera/ A4179-A, Stirpe)**
This bill amends the public health law to clarify the existing law to reflect that healthcare technology platforms do not provide temporary employment services directly, instead providing digital health care service platforms, and clarify that these are intended to be covered under the law.

**Hospital Rule-Based Exclusions**
**(S3486, Hinchey/ A3862, Rozic)**
This legislation amends the public health and insurance laws to require DOH to collect a list of hospital rule-based exclusions from each hospital; publish the list of general hospitals that have these exclusions and specifically what they are on DOH's website to provide patients and the public with information prior to admission to a hospital.

**Wrongful Death (S4423, Hoylman-Sigal/ A6063, Lunsford)**
This bill amends the estates, powers and trusts law to authorize an award in a wrongful death action to include compensation for grief or anguish, the loss of services and support, and the loss of nurture and guidance and would allow a claim to be filed up to three years after the decedents' death.

**Reproductive and Gender-Affirming Care Protections**
**(S4914-B, Hoylman-Sigal/ A5480-C)**
This legislation amends several areas of law to prevent the state from engaging with hostile actors attempting to restrict access to reproductive health care and gender-affirming care. It would also build on professional discipline and medical malpractice protections in New York's shield laws by extending these to more providers that may be engaged in the delivery of gender-affirming or reproductive health care.

**Epinephrine Device Definition**
**(S7807-A, Gounardes/ A5392-B, Rosenthal)**
This bill amends the public health law to expand the definition of epinephrine devices beyond auto-injector devices to include epinephrine nasal sprays.

All of us at Reid, McNally & Savage wish NYSAFP members and your families an enjoyable summer and thank you for your continued support for the Academy's successful advocacy program in New York State.

# TWO VIEWS:
# Integrative Medicine and the Musculoskeletal System

## VIEW ONE

### INTEGRATIVE MEDICINE AS IT RELATES TO MUSCULOSKELETAL PAIN

*By Christine Persaud, MD, MBA, FAAFP, FAMSSM; Sejal Khan, DO, MS; Patrick Cleary, DO and Laurenie Louissaint, MD, MS*

#### BACKGROUND

Musculoskeletal (MSK) pain is one of the leading causes of disability and healthcare utilization worldwide and remains a common complaint in primary care. Conditions such as low back pain, osteoarthritis, and fibromyalgia often lead to chronic discomfort, reduced physical function, and diminished quality of life. Conventional treatments, including NSAIDs, corticosteroid injections, and physical therapy, remain foundational, but they are not always sufficient or well tolerated by all patients. As a result, many individuals seek complementary and integrative medicine approaches that offer a more holistic and patient centered path to pain relief and improved function. These include therapies such as acupuncture, yoga, tai chi, mind-body interventions, and lifestyle based strategies. Primary care physicians increasingly play a central role in guiding patients through evidence based integrative options that align with both medical best practices and patient values.

#### OBJECTIVE

To review the role of integrative medicine in the management of musculoskeletal pain and outline practical, evidence based interventions that can be implemented in a primary care setting.

#### METHODS

A literature review was conducted, focusing on randomized controlled trials, systematic reviews, and meta-analyses evaluating the efficacy of non-pharmacologic and integrative therapies in MSK pain management. Modalities reviewed include acupuncture, dry needling, tai chi, yoga, and mind-body therapies.

#### REVIEW

**Acupuncture** originated in ancient China over 2,000 years ago as a key component of traditional Chinese medicine. During the procedure, practitioners insert thin needles into acupuncture points (acupoint) in the body which can be coupled with electric stimulation techniques to promote healing and restore balance. In Western medicine, acupuncture is increasingly used as a complementary therapy within integrative care models to manage both acute and chronic pain. A review from the Cochrane Database of Systematic Reviews evaluated acupuncture versus sham acupuncture in low back pain and found that acupuncture produced a small improvement in function and a moderate reduction in pain intensity.[1]

## VIEW TWO

### NUTRITIONAL SUPPLEMENTATION IN THE MANAGEMENT OF OSTEOARTHRITIS AND CONNECTIVE TISSUE DISORDERS: A REVIEW OF CLINICAL EVIDENCE

*By Christine Persaud, MD, MBA, FAAFP, FAMSSM; Patrick Cleary, DO; Anter S. Gonzales, MD, FAAP, CAQSM and Michael Khalil, DO*

#### INTRODUCTION

Osteoarthritis (OA) and other musculoskeletal disorders are among the leading causes of disability worldwide, particularly in older adults. These conditions stem from the progressive degeneration of articular cartilage, joint space narrowing, and inflammation—ultimately resulting in pain, stiffness, and impaired function.

Conventional treatments for pain management primarily involve pharmacologic agents such as nonsteroidal anti-inflammatory drugs (NSAIDs) and corticosteroid injections, and, in advanced cases, joint replacement surgery. However, the long-term use of these therapies is often constrained by adverse effects and diminishing efficacy, prompting growing interest in nutritional and dietary supplements as complementary or alternative treatment options.

Supplements such as collagen, glucosamine, chondroitin sulfate, curcumin, vitamins C and D, magnesium, methylsulfonylmethane (MSM), and herbal compounds like Boswellia serrata have been extensively studied. This review evaluates high-level clinical evidence from randomized controlled trials (RCTs) and meta-analyses, with a focus on the efficacy of these supplements in managing OA and related connective tissue disorders—particularly in terms of symptom relief, cartilage preservation, and long-term safety.

#### COLLAGEN SUPPLEMENTS: CARTILAGE PRESERVATION AND SYMPTOM RELIEF

Collagen is the primary structural protein in connective tissue, and its breakdown is a hallmark of osteoarthritis. Two major forms of collagen supplements are hydrolyzed collagen (collagen peptides) and undenatured type II collagen (UC-II). Hydrolyzed collagen is enzymatically broken into smaller peptides to enhance absorption, while UC-II is theorized to induce oral tolerance and reduce joint inflammation.

A 2023 meta-analysis by Bruyère et al. pooled data from 10 RCTs with a total of over 800 participants suffering from knee OA. The study concluded that hydrolyzed collagen significantly improved pain and physical function, measured using validated tools such as the WOMAC (Western Ontario and McMaster Universities Arthritis Index) scale and visual analog scales (VAS).[1] Improvements were generally observed after 3–6 months of daily supplementation, typically at doses between 5–10 grams per day. Importantly, no serious adverse effects were reported, suggesting collagen is a safe long-term option.

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**Dry needling**, though similar in technique to acupuncture, is rooted in Western anatomical and neurological science. It involves inserting thin needles into myofascial trigger points—tight, tender muscle knots—to alleviate pain and improve movement. It has been shown to be effective for conditions such as neck pain, back pain, tendinitis, and myofascial pain syndrome. A systematic review and meta-analysis showed that dry needling performed by physical therapists was superior to no intervention and sham needling.[2] Specifically, it has demonstrated benefits in relieving low back pain, improving pain and function in neck pain and hip osteoarthritis, and reducing pain and disability in fibromyalgia.[3,4,5,6] Primary care physicians with appropriate training and certification can incorporate dry needling into their practice. After identifying palpable trigger points, a sterile needle is placed into the knots and at times a localized twitch response is noted. Minor adverse effects include post treatment soreness, bruising, and bleeding at needle site. Given its minimal equipment and space requirements, dry needling can be performed in the office and seamlessly integrated into standard patient visits.

**Tai chi**, like acupuncture, originated in China but as a martial arts practice that evolved into a gentle, meditative form of exercise. Emphasizing controlled movements, breathwork, and body awareness, tai chi has proven useful in managing chronic MSK pain. A meta-analysis found that tai chi, whether used alone or alongside conventional therapy, significantly improved low back pain.[7] Another review suggested that at least five weeks of tai chi practice may be beneficial for patients with osteoarthritis.[8] In fibromyalgia patients, tai chi has been associated with improved scores on the Fibromyalgia Impact Questionnaire (FIQ) (Table 1).[9] In addition to its benefits for chronic musculoskeletal conditions, tai chi has been also shown to improve balance and reduce the fall risk in the aging population, making it a valuable modality for older adults.

**Yoga**, which originated in ancient India over 5,000 years ago, is a practice centered on unifying the mind, body, and spirit through physical postures, breath control, and meditation. In modern clinical settings, yoga is commonly used to manage conditions such as chronic pain, anxiety, depression, and MSK disorders. A systematic review and meta-analysis comparing yoga to both passive controls (e.g., usual care or patients awaiting treatment) and active comparators found that yoga led to short-term improvements in pain intensity, pain-related disability, mental health, and physical function when compared to passive controls.[10] These improvements, excluding mental health, were also maintained in the long term. However, no significant differences were found between yoga and active comparators in either the short or long term.[10]

Fibromyalgia and chronic pain syndromes are complex and multifactorial conditions marked by widespread pain, fatigue, cognitive disturbances, and poor sleep. Chronic pain syndromes such as chronic fatigue syndrome and complex regional pain syndrome similarly cause persistent, poorly localized pain that is challenging to treat. A systematic review evaluating non-pharmacologic treatments for fibromyalgia, using the FIQ as the primary outcome, found that psychological treatments, including cognitive behavioral therapy (CBT) and mindfulness-based techniques, improved pain, sleep quality, depressive symptoms, and overall FIQ scores.[11] However, these interventions did not significantly improve fatigue in fibromyalgia patients.[11]

The American College of Physicians (ACP) issued clinical guidelines recommending that for acute, subacute, and chronic low back pain, non-pharmacologic treatments, such as acupuncture, yoga, tai chi, motor control exercises, and mindfulness-based stress reduction, should be the first-line approaches before initiating pharmacologic therapy.[12] For acute and subacute low back pain non-pharmacological treatment with acupuncture had low quality evidence and if pharmacologic management is needed, nonsteroidal anti-inflammatory medications was recommended.[12] The strength of this recommendation was graded as strong. In cases of chronic low back pain, both acupuncture and mindfulness-based stress reduction were supported by moderate quality evidence, with a strong recommendation for first line use. Additionally, tai chi and yoga, supported by low quality evidence, also received strong recommendations to be implemented before pharmacologic treatment.[12]

## RESULTS

Integrative therapies such as acupuncture and yoga demonstrate consistent efficacy in reducing chronic low back pain and osteoarthritic symptoms. Dry needling appears especially effective in managing trigger-point-related myofascial pain, neck and hip pain, and fibromyalgia. Mind-body therapies like CBT and mindfulness interventions show measurable benefits in improving overall function, sleep, and mood in patients with chronic pain syndromes. Tai chi is associated with improvements in balance, physical function, and pain perception, particularly in low back pain, osteoarthritis, and fibromyalgia. Though variability exists across studies, many of these approaches offer comparable short-term benefits to standard medical treatments with fewer adverse effects.

## CONCLUSION

Integrative medicine offers a valuable and evidence-supported framework for managing musculoskeletal pain in primary care. These therapies not only address the physical aspects of pain but also support mental and emotional well-being, key elements often overlooked in conventional approaches. Family physicians are uniquely positioned to educate and empower patients to adopt integrative strategies tailored to individual needs, whether through movement practices like yoga and tai chi, mind-body techniques, or complementary modalities like acupuncture and dry needling. Incorporating these interventions into routine care may enhance clinical outcomes, reduce reliance on pharmacologic treatments, and improve patient satisfaction. These interventions provide patients with flexible options that can be added to their treatment plans that align with their lifestyles and personal health goals. Furthermore, they offer a diverse range of approaches that vary in cost, making it possible to accommodate patients from varying socioeconomic backgrounds. Future research should prioritize standardized implementation models, long-term outcome tracking, and cost-effectiveness analyses to better guide clinical integration across diverse patient populations.

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## Endnotes


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## Table 1

### The Revised Fibromyalgia Impact Questionnaire[13]

| | |
|---|---|
| Domain 1 directions: For each of the following nine questions, check the one box that best indicates how much your fibromyalgia made it difficult to do each of the following activities over the past 7 days: | |
| Brush or comb your hair | No difficulty □ □ □ □ □ □ □ □ □ □ □ Very difficult |
| Walk continuously for 20 minutes | No difficulty □ □ □ □ □ □ □ □ □ □ □ Very difficult |
| Prepare a homemade meal | No difficulty □ □ □ □ □ □ □ □ □ □ □ Very difficult |
| Vacuum, scrub, or sweep floors | No difficulty □ □ □ □ □ □ □ □ □ □ □ Very difficult |
| Lift and carry a bag full of groceries | No difficulty □ □ □ □ □ □ □ □ □ □ □ Very difficult |
| Climb one flight of stairs | No difficulty □ □ □ □ □ □ □ □ □ □ □ Very difficult |
| Change bed sheets | No difficulty □ □ □ □ □ □ □ □ □ □ □ Very difficult |
| Sit in a chair for 45 minutes | No difficulty □ □ □ □ □ □ □ □ □ □ □ Very difficult |
| Go shopping for groceries | No difficulty □ □ □ □ □ □ □ □ □ □ □ Very difficult |
| Domain 2 directions: For each of the following two questions, check the one box that best describes the overall impact of your fibromyalgia over the past 7 days: | |
| Fibromyalgia prevented me from accomplishing goals for the week | Never □ □ □ □ □ □ □ □ □ □ □ Always |
| I was completely overwhelmed by my fibromyalgia symptoms | Never □ □ □ □ □ □ □ □ □ □ □ Always |
| Domain 3 directions: For each of the following 10 questions, check the one box that best indicates the intensity of your fibromyalgia symptoms over the past 7 days: | |
| Please rate your level of pain | No pain □ □ □ □ □ □ □ □ □ □ □ Unbearable pain |
| Please rate your level of energy | Lots of energy □ □ □ □ □ □ □ □ □ □ □ No energy |
| Please rate your level of stiffness | No stiffness □ □ □ □ □ □ □ □ □ □ □ Severe stiffness |
| Please rate the quality of your sleep | Awoke rested □ □ □ □ □ □ □ □ □ □ □ Awoke very tired |
| Please rate your level of depression | No depression □ □ □ □ □ □ □ □ □ □ □ Very depressed |
| Please rate your level of memory problems | Good memory □ □ □ □ □ □ □ □ □ □ □ Very poor memory |
| Please rate your level of anxiety | Not anxious □ □ □ □ □ □ □ □ □ □ □ Very anxious |
| Please rate your level of tenderness to touch | No tenderness □ □ □ □ □ □ □ □ □ □ □ Very tender |
| Please rate your level of balance problems | No imbalance □ □ □ □ □ □ □ □ □ □ □ Severe imbalance |
| Please rate your level of sensitivity to loud noises, bright lights, odors, and cold | No sensitivity □ □ □ □ □ □ □ □ □ □ □ Extreme sensitivity |

Scoring: Step 1- Sum the scores for each of the three domains (function, overall, and symptoms). Step 2- Divide domain 1 score by three, divide domain 2 score by one (that is, it is unchanged), and divide domain score 3 by two. Step 3- Add the three resulting domain scores to obtain the total Revised Fibromyalgia Impact Questionnaire score.

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Porfirio and Moura's 2018 systematic review examined studies on both OA and osteoporosis, finding that collagen supplementation contributed to improvements in bone mineral density and joint flexibility.[2] This review also highlighted that collagen may stimulate chondrocyte activity and promote extracellular matrix regeneration, key in slowing cartilage degradation.

In summary, supplementation can moderately reduce pain and improve function in osteoarthritis. It would not be considered a disease-modifying therapy but can be considered as an adjunct for symptomatic management.

## GLUCOSAMINE, CHONDROITIN SULFATE, AND MSM: A COMPLEX EVIDENCE BASE

Glucosamine and chondroitin sulfate are among the most widely used dietary supplements for joint health. These compounds are naturally found in cartilage and are thought to support cartilage integrity and inhibit inflammatory pathways. However, their clinical efficacy has been debated for years.

Wandel et al. (2010) conducted a network meta-analysis that examined data from 10 high quality RCTs involving 3,803 patients with knee or hip OA.[3] Their findings indicated that glucosamine and chondroitin, whether alone or combined, did not produce statistically significant improvements in pain or joint function compared to placebo. The authors concluded that these supplements provided no clinically meaningful benefit and questioned their widespread use in OA management.

In contrast, other studies have suggested a more nuanced picture. A 2017 RCT by Ural et al. involved 147 patients with moderate knee OA, divided into three groups receiving either glucosamine-chondroitin, MSM alone, or a combination of all three.[4] The group receiving the full combination showed statistically significant improvements in pain scores, physical function, and patient-reported quality of life after 12 weeks. These results suggest that MSM may potentiate the effects of glucosamine and chondroitin by enhancing anti-inflammatory pathways and reducing oxidative stress.

MSM, a sulfur-containing compound found in plants and animals, is believed to act through downregulation of nuclear factor-kB (NF-kB) pathways, a key driver of chronic inflammation. Its ability to decrease IL-6, TNF-α, and other pro-inflammatory cytokines may underlie its additive benefit in joint health regimens.

## CURCUMIN (TURMERIC): A POTENT NATURAL ANTI-INFLAMMATORY

Curcumin, the active polyphenol in turmeric (Curcuma longa), has received growing attention due to its well-documented anti-inflammatory and analgesic properties. Several meta-analyses have evaluated its efficacy in joint disorders.

Daily et al. (2016) reviewed eight RCTs involving 606 participants with OA and found that curcumin significantly improved joint pain and physical function, with effects similar to NSAIDs such as ibuprofen and diclofenac.[5] Importantly, curcumin was associated with fewer gastrointestinal side effects. The effective dosages ranged from 500 mg to 2,000 mg daily, typically administered in bioavailable forms like curcumin-piperine complexes.

A more recent 2022 meta-analysis by Zeng et al. incorporated data from 29 RCTs including 2,396 patients and confirmed that both curcumin and turmeric extracts significantly reduced pain, improved function, and lowered inflammation markers like CRP (C-reactive protein) and ESR (erythrocyte sedimentation rate).[6] These studies often used the WOMAC score, VAS, and Lequesne's index to measure outcomes, and results were significant within 8–12 weeks of treatment.

Curcumin is thought to act through inhibition of cyclooxygenase-2 (COX-2), lipoxygenase (LOX), and NF-kB, all involved in inflammatory cascades. It also possesses antioxidant activity, which may protect chondrocytes from oxidative damage—a factor in cartilage degeneration.

## VITAMIN D: VARIABLE BENEFITS BASED ON BASELINE STATUS

Vitamin D plays a central role in calcium and phosphorus homeostasis, essential for maintaining bone mineralization and skeletal integrity. Its importance extends beyond bone density, influencing immune function and inflammatory regulation, which are increasingly recognized as key factors in the pathogenesis of osteoarthritis (OA) and other connective tissue disorders.

Vitamin D exerts its biological effects primarily through the vitamin D receptor (VDR), which is expressed in chondrocytes, osteoblasts, synoviocytes, and immune cells. Upon activation, VDR modulates gene transcription involved in calcium transport, collagen synthesis, and inhibition of pro-inflammatory cytokines such as interleukin-1β and tumor necrosis factor-alpha (TNF-α). This dual function—enhancing bone strength and reducing inflammation—makes vitamin D a valuable candidate for the prevention and treatment of OA and related conditions.

Numerous observational studies have linked low serum 25-hydroxyvitamin D [25(OH)D] levels with increased risk and severity of OA. However, randomized controlled trials (RCTs) have yielded mixed findings regarding the therapeutic efficacy of vitamin D supplementation in slowing OA progression or alleviating symptoms.

A 2019 meta-analysis by Liu et al. synthesized data from eight RCTs including over 2,000 participants. The study found that vitamin D supplementation (ranging from 800 to 2,000 IU/day) was modestly effective in reducing pain and improving physical function in individuals with knee OA, especially among those with baseline vitamin D deficiency (<20 ng/mL).[7] However, the improvements were more pronounced in the short term (under 6 months), and effects tended to plateau over time.

Similarly, the 2023 meta-analysis by Zhang et al., which included data from both RCTs and large-scale cohort studies, found that vitamin D supplementation significantly reduced cartilage volume loss in the medial compartment of the knee, as evidenced by MRI imaging. This structural benefit was associated with slowed OA progression but did not always correlate with subjective symptom improvement, indicating that vitamin D's benefits may be more preventative or supportive than directly symptomatic.

Vitamin D's influence on connective tissues also includes modulation of matrix metalloproteinases (MMPs), enzymes that degrade extracellular matrix components in cartilage. In vitro

studies suggest that vitamin D may downregulate MMP-13 expression in osteoarthritic chondrocytes, thereby reducing cartilage breakdown. Additionally, adequate vitamin D status is associated with improved muscle strength and reduced risk of falls and fractures, further emphasizing its importance in comprehensive musculoskeletal health.

Current guidelines recommend serum 25(OH)D levels of at least 30 ng/mL for optimal bone health, although some suggest higher thresholds for patients with OA or those at high risk for falls and fractures. Supplementation dosages commonly range from 1,000 to 2,000 IU/day, with higher doses used in cases of documented deficiency.

While vitamin D supplementation is generally safe and well-tolerated, clinicians should monitor serum calcium and 25(OH)D levels periodically to avoid hypercalcemia or toxicity in long-term users. Moreover, as evidence suggests that vitamin D may offer the greatest benefit in deficient individuals, routine screening may be warranted in older adults, especially those with limited sun exposure or comorbid conditions affecting absorption.

## VITAMIN C: HEALING SUPPORT AND POSTOPERATIVE BENEFITS

Vitamin C (ascorbic acid) is a water-soluble antioxidant vital for collagen synthesis and immune function. Its benefits are particularly evident in postoperative orthopedic recovery and connective tissue repair.

A 2021 meta-analysis by Morrison et al. focused on vitamin C's role in preventing complex regional pain syndrome (CRPS) following orthopedic procedures.[8] Analyzing 10 RCTs, the study found a statistically significant reduction in CRPS incidence in patients receiving 500 to 1,000 mg of vitamin C daily for 45 days postoperatively. The proposed mechanism involves reduced oxidative stress and improved tissue healing.

Although fewer RCTs have investigated vitamin C's role in managing OA directly, its known involvement in collagen cross-linking and scavenging of reactive oxygen species (ROS) supports its use in connective tissue maintenance. Early potential benefits seen in RCTs include a lower VAS in Class I and II OA, with follow-up at 3, 6, and 12 months.[9] A 2022 pilot trial with 25 patients found that 12 weeks of ascorbic acid alone significantly reduced WOMAC pain scores in knee OA patients, while a combination of ascorbic acid and phenolic compounds led to significant improvements in both WOMAC and VAS pain scales.[10]

Vitamin C may be especially beneficial when combined with other supplements like collagen or MSM.

## MAGNESIUM: AN EMERGING ROLE IN JOINT PRESERVATION

Magnesium is the fourth most abundant mineral in the human body and is essential for over 300 enzymatic reactions. In the context of musculoskeletal health, magnesium is a cofactor in bone formation, energy metabolism, nerve conduction, and the regulation of inflammation and muscle function. Low magnesium levels have been associated with increased risks of osteoporosis, sarcopenia, and chronic inflammation, which can exacerbate conditions like osteoarthritis (OA) and connective tissue disorders.

Magnesium contributes to bone structure by interacting with calcium and vitamin D in a synergistic fashion. It regulates calcium transport and influences parathyroid hormone (PTH) secretion, both of which are crucial for bone remodeling. Magnesium deficiency can impair bone mineral density (BMD), alter osteoblast and osteoclast activity, and promote low-grade systemic inflammation.

Epidemiological studies from the Osteoarthritis Initiative assessed magnesium intake from food and supplements in 2,548 participants. Subjects with lower magnesium intake were found to have worse knee OA pain and function scores, which remained consistent after adjusting for different variables including BMI, age, sex, race, fiber intake, physical activity, smoking, alcohol, pain medication use, and renal insufficiency.[11]

A 2015 observational study by Zeng et al. involving over 5,000 participants in the NHANES cohort found an inverse association between dietary magnesium intake and radiographic knee OA.[12] Higher magnesium intake was associated with lower prevalence of joint space narrowing and osteophyte formation. While observational data cannot confirm causality, these findings align with magnesium's role in reducing systemic inflammation.

A 2017 review by Castiglioni et al. found that higher dietary magnesium intake was positively associated with increased BMD and reduced fracture risk, especially in postmenopausal women. Another study by Veronese et al. (2017) linked low serum magnesium levels with greater cartilage damage and reduced knee function in OA patients.

There are multiple forms of magnesium supplements, each with varying bioavailability and clinical applications:

1. **Magnesium Citrate**
   - Commonly used for general supplementation and to relieve mild constipation due to its mild laxative effect. It is easily absorbed and well-tolerated. Its high bioavailability makes it a reliable source for addressing systemic magnesium deficiency, which may benefit bone and joint health indirectly.
2. **Magnesium Glycinate**
   - Bound to the amino acid glycine, this form is gentle on the stomach and known for its calming, anti-anxiety effects. It also has a high bioavailability and can be useful for individuals with chronic pain and sleep disturbances, both common in arthritis patients. Glycine also has anti-inflammatory properties, which may provide additional benefit in joint health.
3. **Magnesium Oxide**
   - This has a high elemental magnesium content but poor absorption. Often used for short-term relief of constipation or as an antacid. It is not ideal for addressing systemic magnesium deficiency due to low absorption; limited direct benefits for bone or connective tissue health.
4. **Magnesium Malate**
   - This contains malic acid, which is involved in ATP production and may reduce muscle pain and fatigue due to its moderate bioavailability. Frequently used in fibromyalgia and chronic fatigue syndrome, but may benefit OA patients with muscular tension or widespread discomfort.

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5. **Magnesium Threonate**
   - This subtype is specifically designed to enhance magnesium delivery to the brain, potentially improving cognitive function and neuroinflammation. It may be beneficial for older adults with OA who also experience cognitive decline, sleep disturbances, or depression—common comorbidities that can affect pain perception and treatment compliance.
6. **Magnesium Chloride**
   - This is readily absorbed and available in oral and topical forms. It is sometimes used to reduce localized muscle pain and cramps, although clinical data on its efficacy is limited.

Despite the lack of large RCTs, smaller studies suggest that magnesium supplementation may improve muscle cramps, stiffness, and even bone turnover markers. Deficiency in magnesium, especially in older adults, could worsen cartilage breakdown and inflammatory responses.

## BOSWELLIA AND UNDENATURED TYPE II COLLAGEN (UC-II): IMMUNE AND STRUCTURAL BENEFITS

Boswellia serrata, an herbal extract rich in boswellic acids, is known to inhibit 5-lipoxygenase and suppress leukotriene production—mechanisms implicated in arthritis inflammation. UC-II, derived from chicken sternum cartilage, contains small amounts of intact collagen that may help retrain the immune system to recognize joint cartilage as "self" tissue.

Cruscanti et al.'s 2023 scoping review synthesized clinical data on both agents, finding that they significantly improved joint mobility and reduced pain in mild-to-moderate OA cases.[13] Clinical trials cited in the review used dosages of 40 mg/day for UC-II and 100–250 mg/day of Boswellia extract, often in combination with other supplements. A 2022 randomized trial by Valsamidou et al. also found that a combination nutraceutical including Boswellia significantly reduced WOMAC pain scores in knee OA patients compared to placebo.[14]

UC-II acts through oral tolerance, reducing inflammatory T-cell activity directed at cartilage. Boswellia's anti-inflammatory effects, in turn, complement structural support supplements like collagen and MSM. Both agents have demonstrated safety and tolerability in long-term use.

## CONCLUSION

A growing body of high-level clinical evidence supports the use of certain nutritional supplements as adjuncts in managing osteoarthritis and connective tissue disorders. Supplements like collagen, curcumin, MSM, Boswellia, and UC-II consistently show clinically meaningful improvements in pain, joint function, and inflammation in both short and long-term trials. Others, like vitamins C and D and magnesium, may offer conditional benefits depending on deficiency status or post-injury needs. Conversely, glucosamine and chondroitin, once considered cornerstones of joint supplementation, now show inconsistent benefits unless paired with synergistic agents like MSM.

Overall, nutritional supplements should not be viewed as substitutes for evidence-based medical or surgical treatment, but they can offer safe, effective, and well-tolerated support, particularly in early-stage OA, for patients who prefer natural approaches, or for those with medical contraindications to traditionally used pain relievers, such as oral NSAIDs. Future research should focus on identifying ideal combinations, establishing standardized dosages, and exploring long-term structural outcomes using imaging and biomarker data.

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**Table: Summary of Nutritional Supplements for Osteoarthritis and Connective Tissue Disorders**

| Supplement | Clinical Use / Target Outcome | Strength of Recommendation | Level of Evidence | Notes |
|---|---|---|---|---|
| Collagen (Hydrolyzed & UC-II) | Joint pain reduction, cartilage protection | A – Strongly recommended | I – High-quality evidence from multiple RCTs/meta-analyses | UC-II shows joint protection and pain relief; hydrolyzed collagen also effective. |
| Glucosamine | Pain relief, OA symptom improvement | C – Selective recommendation | II-2 – Moderate evidence from well-designed cohort or inconsistent RCTs | Conflicting data; may help some patients, particularly with sulfate form. |
| Chondroitin Sulfate | Pain relief, joint space narrowing | B – Recommended in combination | II-2 – Moderate evidence | Works better when paired with glucosamine or MSM; slow onset of action. |
| MSM (Methylsulfonylmethane) | Anti-inflammatory, pain relief | B – Recommended | II-2 – Moderate evidence | Consistent results in pain reduction, especially in combination formulas. |
| Curcumin (Turmeric) | Inflammation and OA pain management | A – Strongly recommended | I – High-quality RCTs/ meta-analyses | Comparable to NSAIDs in pain relief; fewer adverse effects; enhanced with piperine. |
| Vitamin D | Bone health, cartilage preservation | B – Recommended for deficiency | II-1 – Moderate evidence from controlled trials | Strongest effects in deficient individuals; role in structural progression supported. |
| Magnesium (various forms) | Bone mineralization, inflammation modulation | B – Recommended | II-2 – Observational + supportive mechanistic data | Forms like glycinate and citrate preferred for absorption; helpful in muscle pain and bone health. |
| Boswellia Serrata | Pain and inflammation relief | A – Strongly recommended | I – High-quality RCTs/ meta-analyses | Effective and well-tolerated; synergistic with curcumin. |
| Vitamin C | Collagen synthesis, antioxidant support | C – Consider in deficiency | III – Expert opinion, limited trials | Theoretical support strong; human clinical data specific to OA lacking. |
| Hyaluronic Acid (oral) | Joint lubrication, symptom relief | C – Use with caution | II-3 – Small studies with design limitations | Evidence weaker than injections; some benefit in mild OA cases after prolonged use. |

**Grading Key**

**Strength of Recommendation**

A – Strongly recommended (clear benefit, consistent evidence)
B – Recommended (moderate benefit or benefit in subgroups)
C – Selectively recommended (may be useful in certain cases)
D – Not recommended (evidence of ineffectiveness or harm)

**Level of Evidence**

I – Evidence from ≥1 properly randomized controlled trial
II-1 – Controlled trials without randomization
II-2 – Well-designed cohort or case-control studies
II-3 – Time-series, multiple case reports, or uncontrolled studies
III – Expert opinion, descriptive studies, or clinical experience

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# Analyzing the Scope of Integrative Medicine Knowledge, Practice, and Perceived Utility Among Family Medicine Physicians

*By Pavit Suri; Senya Huda; Sara Siddiqui; Aditya Bissoonauth; Barbara Keber, MD and Tochi Iroku-Malize, MD, MBA*

## Introduction

Integrative medicine is defined as "healing oriented medicine that takes account of the whole person (body, mind, and spirit) including all aspects of lifestyle. It emphasizes therapeutic relationships and makes use of all appropriate therapies, both conventional and alternative."[1] It incorporates not only Western medicine practices, but also complementary and alternative approaches as well. Analysis done by the National Institutes of Health's National Center for Complementary and Integrative Health (NCCIH) demonstrates that the use of these approaches has significantly increased, with the percentage of patients using practices such as yoga and acupuncture increasing from 19.2% in 2002 to 36.7% in 2022.[2] Though the field is growing, it is not yet considered a standard of care.

It is estimated that, in total, patients spend over $30.2 billion per year out of pocket for visits to integrative health practitioners, such as acupuncturists, chiropractors, or on natural products, which makes up 1.1% of all sources of healthcare spending and 9.2% of all out-of-pocket spending on healthcare by Americans.[3] This high expenditure reflects both the intense demand for these services, and limitations to equitable access by patients who are seeking holistic care. Although the presence of integrative medicine is on the rise in academic centers and patient interest, its integration into everyday clinical practice remains uneven. Beyond family medicine, it is crucial to numerous other specialties including pediatrics, otolaryngology, gastroenterology, and cardiology. Family medicine physicians have a unique role in that they are often the first point of contact for patients who are pursuing holistic care and play an important role in the health behavior change process. By incorporating integrative medicine practices, the patient is provided with additional options in how they choose to address and manage their health concerns and goals.[4]

Despite its potential to enhance patient-centered care, studies analyzing the knowledge and perceived utility of integrative medicine exist but are not current, do not investigate the role of integrative medicine within a healthcare system or specific medical field, and do not investigate the reasons for specific beliefs. Gaining insight into these perspectives is fundamental to bridging the gap between expanding patient demand and physician implementation of integrative medicine practices. Thus, our aim was to conduct a study to compare the knowledge and perceived utility regarding integrative medicine among family physicians within Northwell Health and the New York State Academy of Family Physicians (NYSAFP) to gain insight into the future practice, relevance, and scope of integrative medicine.

## Methods

In 2022, over 500 family medicine physicians, including residents and attendings, who were members of the NYSAFP, within Northwell Health, and/or practicing within their communities in NY were sent a one-time, brief, confidential, voluntary electronic questionnaire with multiple choice and open-ended questions. This survey was disseminated through the REDCap software. Data collection was conducted for five weeks in which weekly reminders to complete the survey were sent. The questionnaire included questions about physician demographics (e.g., age, gender, race/ethnicity), practice (e.g., years of practice, type of practice- hospital medicine, ambulatory, etc.), stage of career (PGY 1, 2, 3, fellow, attending), place of employment, etc. Questions were also asked about the 1) knowledge and training family physicians have in integrative medicine, 2) level of comfort family medicine physicians have in implementing integrative medicine into their practice, 3) potential gaps in care current physicians believe exist in family medicine, 4) whether they believe integrative medicine can ameliorate those gaps, and 5) what resources would be needed to help implement integrative medicine into practice. Some questions were open-ended while others were multiple choice. The Likert scale was used for some questions to determine the level of agreement regarding specific ratings.

## Results

51 physicians responded to the survey. The demographics of the respondents are included below in Figure 1:

**Figure 1. Baseline Demographics of Respondents**

| | | |
|---|---|---|
| **Age** | 18-25 | 0 people, {0.0%) |
| | 26-45 | 21 people {41.2%) |
| | 46-55 | 9 people {17.6%) |
| | 56-65 | 5 people {9.8%) |
| | 65+ | 16 people {31.4%) |
| **Gender** | Male | 20 people (40.0%) |
| | Female | 27 people (54.0%) |
| | Prefer not to say | 3 people {6.0%) |
| | No response | 1 person (2.0%) |
| **Race** | American Indian or Alaska Native | 0 people (0.0%) |
| | Asian | 7 people {13.7%) |
| | Black or African American | 4 people {7.8%) |
| | Native Hawaiian or Other Pacific Islander | 0 people {0.0%) |
| | White | 30 people {58.8%) |
| | Other | 4 people {7.8%) |
| | Prefer not to say | 6 people (11.8%) |
| **Ethnicity** | Hispanic or Latino | 4 people (8.0%) |
| | Not Hispanic or Latino | 40 people {80.0%) |
| | Prefer not to say | 6 people (12.0%) |
| | No response | 1 person {2.0%) |
| **Employment at Northwell?** | Yes | 32 people (64.0%) |
| | No | 18 people {36.0%) |
| | No response | 1 person (2.0%) |
| **What stage of your career are you in?** | PGY 1 | 1 person {2.0%) |
| | PGY2 | 1 person (2.0%) |
| | PGY 3 | 1 person (2.0%) |
| | Fellow | 0 people (0.0%) |
| | Attending | 48 people {94.1%) |

Results from the questionnaire showed that 84.6% of physicians reported that they had some level of understanding of integrative medicine, while 9.6% reported a high level of understanding and 5.8% reported no understanding (Figure 2). Of the physicians who reported a high level of understanding, 80% chose the wrong multiple-choice answer for the definition of integrative medicine. Of those who reported some level of understanding, 20% chose the wrong answer choice (Figure 3).

Only 65.2% of physicians reported that they were open to practicing integrative medicine, while 23.9% were somewhat open, and 10.9% were not open (Figure 4). However, after sharing that novel, peer-reviewed research supported the use of integrative medicine, only 12.5% of physicians changed their answer to yes in regard to using integrative medicine in practice. 43.8% of physicians reported they were open to using integrative medicine but not completely, attributing their reluctance to reasons such as a lack of "comfort" with the label since the field practices on the edge of conventional medicine, as well as the need for more evidence and larger sample sizes. 43.8% of physicians did not change their answers and remained firm in not practicing integrative medicine, attributing this to lack of time or stating, "I know how to practice medicine" (Figure 5).

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**Figure 2. Self-reported Level of Understanding of Integrative Medicine**

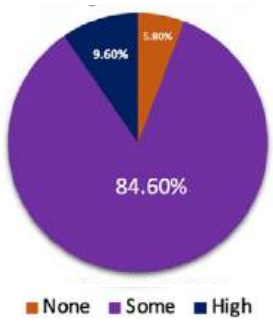



**Figure 3. Physicians Who Chose the Wrong Answer for Definition of Integrative Medicine**

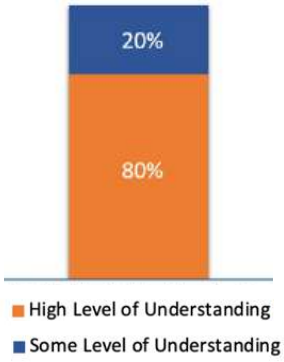



**Figure 4. Physicians Open to Practicing Integrative Medicine**

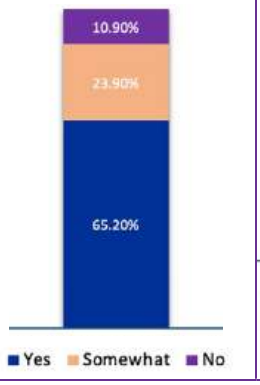



**Figure 5. Physicians Who Changed Their Answer After They Were Told that Novel Peer-reviewed Research Supported Integrative Medicine**

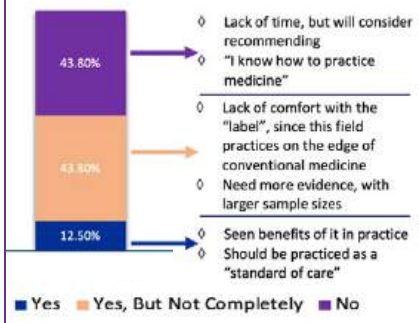
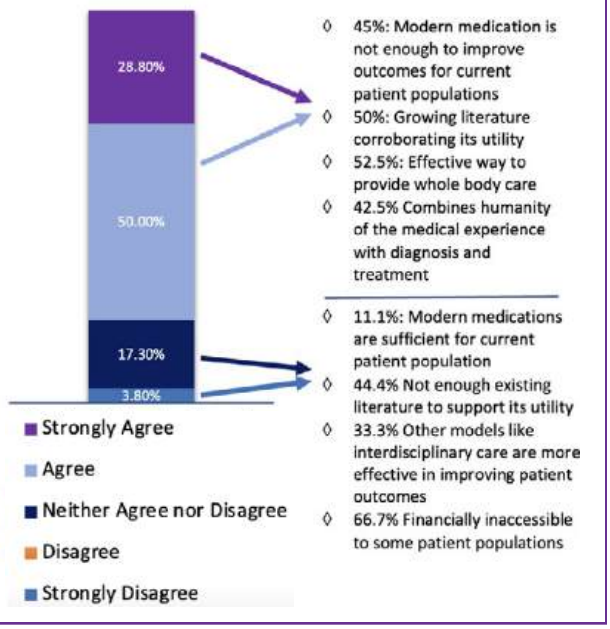



**Figure 6. Level of Agreement to the Statement "Integrative Medicine Can Enhance the Level of Care for My Patients by Improving Patient Outcomes"**



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Of the physicians who responded, 78.8% believed that integrative medicine can enhance the level of care for their patients by improving patient outcomes. Reasonings for this included that modern medication is not enough to improve outcomes for current patient populations, corroboration of the field's utility by growing literature, that integrative medicine is an effective way to provide whole body care, and that it combines the humanity of the medical experience with diagnosis and treatment. 21.1% disagreed that integrative medicine can enhance the level of care for their patients by improving patient outcomes. This was due to beliefs like modern medications are sufficient for the current patient population, that there is not enough existing literature to support integrative medicine's utility, that other models like interdisciplinary care are more effective in improving patient outcomes or that integrative medicine is financially inaccessible to some patient populations (Figure 6).

100% of Asian-identifying physicians were open or somewhat open to practicing integrative medicine and all believed it improves patient outcomes. 100% of the African American or Black-identifying physicians were open or somewhat open to practicing, while 50% believed that integrative medicine improves patient outcomes. 90% of White-identifying physicians were open or somewhat open to practicing, while 76.7% believed that integrative medicine improves patient outcomes (Figure 7).

Of those employed by Northwell Health, 100% of these physicians were open or somewhat open to practicing, while 81.3% believed that integrative medicine improves patient outcomes. Of those who were members of the AAFP/NYSAFP who were employed elsewhere, 66.7% of these physicians were open or somewhat open to practicing, while 77.8% believed that integrative medicine improves patient outcomes (Figure 8).

80% of male physicians were open or somewhat open to practicing, while 80% believed that integrative medicine improves patient outcomes. 100% of female physicians were open or somewhat open to practicing integrative medicine, while 85% believed that integrative medicine improves patient outcomes (Figure 9). Additionally, 44.4% of female physicians strongly agreed that integrative medicine improves patient outcomes compared to the 10% of males that strongly agreed.

90% of physicians aged between 26-45 were open or somewhat open to practicing, while 90.5% believed that integrative medicine improves patient outcomes. 100% of physicians aged between 45-55 were open or somewhat open to practicing integrative medicine, while 67% believed that integrative medicine improves patient outcomes. 60% of physicians aged between 56-65 were open or somewhat open to practicing, while 60% believed that integrative medicine improves patient outcomes. 68.8% of physicians aged over 65 were open or somewhat open to practicing integrative medicine, while 81.3% believed that integrative medicine improves patient outcomes (Figure 10). An important distinction in strength of opinion between these age groups was demonstrated by 47.6% of those aged from 26-45 strongly agreed that integrative medicine improves patient outcomes, while 0% for 46-55, 20% for 56-65, and 18.8% of those over 65 strongly agreed.

**Figure 7. Beliefs on Integrative Medicine by Race**

| Race | American Indian or Alaska Native (0%) | Asian (13.7%) | Black or African American (7.8%) | Native Hawaiian or Other Pacific Islander (0%) | White (58.8%) | Other (7.8%) | Prefer not to Say (11.8%) |
|---|---|---|---|---|---|---|---|
| Open or Somewhat Open to Practicing Integrative Medicine | N/A | 100% | 100% | N/A | 90% | N/A | N/A |
| Believes Integrative Medicine Improves Patient Outcomes | N/A | 100% | 50% | N/A | 76.7% | N/A | N/A |

**Figure 8. Beliefs on Integrative Medicine by Employment**

| Employment at Northwell | Yes (64%) | No (36%) |
|---|---|---|
| Open or Somewhat Opento Practicing Integrative Medicine | 100% | 66.7% |
| Believes Integrative Medicine Improves Patient Outcomes | 81.3% | 77.8% |

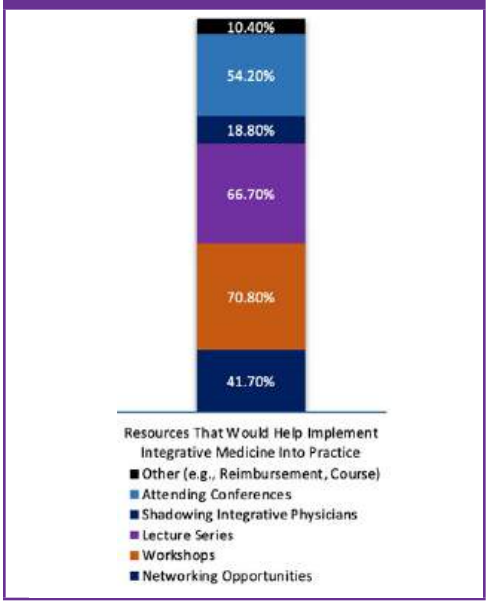
**Figure 9. Beliefs on Integrative Medicine by Gender**

| Gender | Male (40%) | Female (54%) | Prefer Not To Say (6%) |
|---|---|---|---|
| Open or Somewhat Open to Practicing Integrative Medicine | 80% | 100% | N/A |
| Believes Integrative Medicine Improves Patient Outcomes | 80% | 85% | N/A |

**Figure 10. Beliefs on Integrative Medicine by Age**

| Age | 18-25 (0%) | 26-45 (41.2%) | 46-55 (17.6%) | 56-65 (9.8%) | 65+ (31.4%) |
|---|---|---|---|---|---|
| Open or Somewhat Open to Practicing Integrative Medicine | N/A | 90% | 100% | 60% | 68.8% |
| Believes Integrative Medicine Improves Patient Outcomes | N/A | 90.5% | 67% | 60% | 81.3% |

**Figure 11. Resources that Would Help Implement Integrative Medicine into Practice**




Physicians stated resources would help implement integrative medicine into practice. 70.8% reported that attending workshops would be beneficial. 66.7% reported a lecture series would be helpful. 54.2% thought that attending conferences would be beneficial. 41.7% indicated that networking opportunities would help with implementation. 18.8% indicated that shadowing an integrative medicine practitioner would be helpful, while 10.4% indicated that other intentions (i.e. reimburse-ment or courses) would be helpful (Figure 11).

## Discussion

This study highlights the complexity of the perceptions that family medicine physicians have regarding integrative medicine. Our results highlight that there is a misconception towards what integrative medicine really is, which is emphasized through 80% of physicians who reported a high level of understanding of integrative medicine incorrectly answered the survey question asking which definition best described the field. Though physicians are open to practicing integrative medicine, results of this survey demonstrate that the field is relatively skeptical towards the effectiveness of utilizing it. This is potentially influenced by the race, gender, age, and health system association of the physician. Particularly, physicians aged between 26-45 seemed to find the most benefit from integrative medicine, as seen through 47.6% in this age group specifically strongly agreed that integrative medicine improves patient outcomes, compared to 0% for 46-55, 20% for 56-65, and 18.8% of those over 65. This highlights that younger physicians may be more receptive to integrative approaches, suggesting that efforts to increase an accurate understanding and implementation of integrative medicine could be most impactful if targeted towards this demographic. Additionally, 44.4% of female physicians strongly agreed that integrative medicine improves patient outcomes compared to the 10% of males that strongly agreed, also highlighting another potential important demographic difference.

In a systematic review, Aizuddin et. al found that one of the main reasons physicians have a negative perception of integrative medicine was due to skepticism towards the practice, regardless of patients expressing positive results from its use.[5] Güthlin et. al even found that some physicians believed it to belong to "another world."[6] This emphasizes the need of increasing awareness about what integrative medicine truly is, potentially through the methods favorable to physicians as recorded in our survey, such as lecture series and workshops. Furthermore, this calls attention to the role of cultural differences in the perception of integrative medicine, in tandem with our results, which demonstrated that all Asian-identifying physicians who responded believed that its use would improve patient outcomes, while only 50% of African American or Black-identifying physicians and 76.7% of White-identifying physicians believed in its benefits (Figure 7). This highlights the importance of a potential need for change in the culture of medicine as we continue to investigate the dual roles of integrative and allopathic practices. A significant majority of patients with chronic illnesses use some type of integrative medicine practices, however, many of them do not share this with their physicians due to concerns about judgment from their provider.[7]

Future directions include conducting research that clarifies the role of integrative medicine in patient care, as well as increasing the scope of the study in terms of the geography and/or medical fields assessed. It is also vital to analyze patient perspectives towards integrative medicine and its ability to enhance patient outcomes. Lastly, it is crucial to determine how to increase access to integrative medicine services, by addressing barriers such as training, resources, cost, and coverage. This research acts as a stepping stone for future initiatives to address disparities between patient interest and provider readiness, with the goal of advancing patient care models to be more holistic, personalized, and effective.

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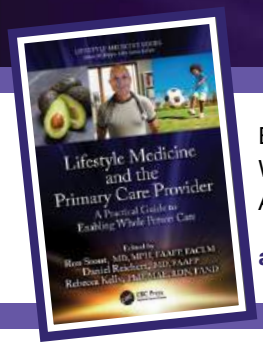


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# Integrative Approaches to Managing Female Dyspareunia

*By Saehyeon Kim, MD, PhD; Julia Schmutz, MD and James Greenwald, MD*

## What is Dyspareunia? Understanding the Differences Among Related Terms

**Dyspareunia** is the most commonly used term to describe pain during sexual intercourse.[1] It can significantly affect a woman's physical and emotional well-being, as well as her intimate relationships.[1,2] In the United States, dyspareunia is estimated to affect 10–20% of women, though prevalence varies by age and other demographic factors.[3] Women with sexual pain often experience reduced quality of life, relationship difficulties, and higher rates of anxiety and depression.[2] Dyspareunia can be categorized in several ways. It is classified as superficial—pain at the vulva or vaginal opening—or deep, which refers to pain in the deeper vagina or pelvis, often triggered by deep penetration. It is also distinguished as primary, beginning with a woman's first sexual experiences, or secondary, developing after a period of pain-free intercourse.[1]

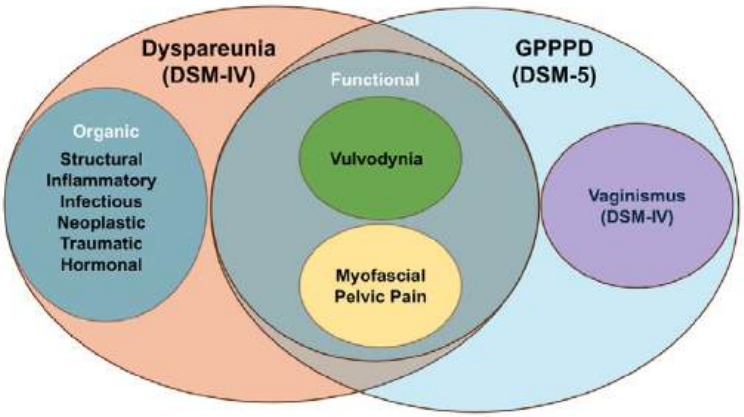
Historically, the term has been broadly applied to describe any genital pain associated with sexual activity, regardless of cause.[4] Today, however, dyspareunia is understood as a symptom—rather than a diagnosis in itself—with potential origins in physical, muscular, neurological, or psychological conditions.[5] Currently, functional dyspareunia is more precisely defined and categorized as follows:

**Vulvodynia** refers to chronic vulvar pain without an identifiable cause. It often affects the vestibule and causes superficial dyspareunia.[6] Patients may describe burning, stinging, or raw sensations, and in severe cases, even sitting or wearing tight clothing can provoke pain. Clinical findings may include localized tenderness or redness suggestive of focal neuropathic inflammation.[7] Research into vulvodynia increasingly explores neuroimmune pathways, genetic predispositions, and central and peripheral sensitization mechanisms.[6]

**Myofascial pelvic pain syndrome (MPPS)** —often considered a subset of chronic pelvic pain (CPP)— has emerged more recently as a major contributor to sexual pain, particularly in patients with deep dyspareunia.[8] It involves trigger points in the pelvic floor muscles that refer pain to the vagina or pelvis, and is often underdiagnosed. Research is expanding in this area, focusing on manual therapy, physical therapy, and botulinum toxin injections as potential treatments.[9]

**Vaginismus** is characterized by involuntary contraction of the pelvic floor muscles that makes vaginal penetration difficult or impossible.[10] Once classified purely as a psychogenic disorder (as in DSM-IV), it is now recognized to have both physical and psychological components. Recently, DSM-5 introduced the category **Genito-Pelvic Pain/Penetration Disorder (GPPPD)**, which combines dyspareunia and vaginismus to emphasize the clinical overlap and the need for a more integrated diagnostic approach, reflecting both physical and emotional dimensions.[11]

A summary diagram (Figure 1) illustrates the relationships among these overlapping conditions to clarify terminology and pathophysiological mechanisms in female sexual pain disorders. While each condition is represented as a separate entity, it is essential to recognize that they frequently co-occur in clinical practice.




## Emerging Evidence for Integrative Approaches in Functional Dyspareunia

Medical options such as topical treatments, oral medications, and injections may be beneficial for some women with dyspareunia, that would include local anesthetics, hormonal treatments, anti-inflammatory agents, botulinum toxin type A, tricyclic antidepressants and anticonvulsants, as well as surgical interventions in selected cases. For further details, please refer to current clinical guidelines and pharmacologic reviews.[12,13]

In this section, we summarize the available evidence on integrative approaches for reproductive-age women with functional dyspareunia. Similar to medical management, many of these interventions are supported by limited data from small or low-quality studies, and therefore lack definitive evidence at this time.

**continued on page 26**

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## Physical/Manual Therapies

Pelvic-floor physiotherapy has the strongest supporting evidence among physical modalities. A typical course consists of weekly or biweekly sessions over 8–12 weeks, including pelvic floor assessment, manual therapy (e.g., internal trigger point release), EMG biofeedback, relaxation training, and patient education, usually provided by a pelvic floor-trained physical therapist. Multiple RCTs and a meta-analysis have shown significant improvements in pain, sexual function, and quality of life for patients with dyspareunia and pelvic floor dysfunction.[14–16]

Myofascial release (MFR) is a manual therapy technique targeting tight, painful areas ("trigger points") in the pelvic floor and surrounding musculature. It involves gentle, sustained pressure to relieve fascial restrictions and restore normal muscle function. MFR is often integrated into multimodal physiotherapy programs alongside EMG biofeedback and education. Such integrated protocols have shown significant benefit in randomized controlled trials for women with provoked vestibulodynia and myofascial pelvic pain syndrome.[14,17,18]

Trigger point injections (TPI) with local anesthetics, botulinum toxin A or saline are used to treat focal myofascial pelvic pain. Administered by trained gynecologists or pain specialists, TPI sessions target identified trigger points via transvaginal or perineal approach. TPI can help diagnose MPPS (if the patient's pain improves or resolves after injection, then MPPS is likely the cause), and a positive response often indicates a good prognosis.[19] Small studies suggest its efficacy.[20,21]

### Neuro-muscular Reeducation

EMG biofeedback trains patients to voluntarily relax or engage the pelvic floor muscles using visual or auditory feedback from sensors. While some RCTs report improvements in pelvic floor coordination and pain symptoms, outcomes are mixed, especially when compared to CBT or comprehensive physiotherapy.[15,22]

Transcutaneous electrical nerve stimulation (TENS) involves surface electrode stimulation of the pelvic region to modulate pain and improve neuromuscular control. RCTs have shown that TENS may help reduce intercourse-related pain and improve muscle relaxation in women with vulvodynia.[23,24]

### Mind-Body and Psychological Therapies

Cognitive-behavioral therapy (CBT) is a well-supported psychological approach for functional sexual pain, particularly when anxiety, pain catastrophizing, or maladaptive coping are present. Ideally, CBT is delivered in weekly sessions over 8–12 weeks by a psychologist or sex therapist and includes psychoeducation, pain management strategies, exposure therapy, and communication training. RCTs have shown CBT to improve pain coping, reduce sexual distress, and increase sexual satisfaction, especially in women with vulvodynia.[15]

Mindfulness-based CBT (mCBT) is gaining traction as a more holistic alternative. RCTs suggest modest improvements in pain and anxiety, although some studies report that benefits may diminish after 6–12 months.[25,26]

Sex therapy and couples therapy are generally recommended when relationship dynamics or fear of intimacy contribute to the pain experience. Although direct RCT evidence is limited, clinical practice guidelines often include these approaches as part of a multidisciplinary strategy for sexual pain disorders.[27]

Also, it is important to note that dyspareunia is often accompanied by a history of partner abuse or sexual trauma, in which case a more individualized approach is warranted rather than couple's therapy.[28] In such contexts, trauma-informed care and careful screening are critical components of effective psychological intervention.

### Complementary Medicine

Traditional acupuncture may be beneficial for selected patients. RCTs on acupuncture for dyspareunia and vulvodynia have produced mixed results, with some reporting modest improvements and others finding no significant benefit compared to sham or standard care.[29]

Ayurvedic therapies and herbal supplements (e.g., nervine or anti-inflammatory botanicals) are sometimes used by patients for chronic pain, though there is no direct RCT evidence for their efficacy in dyspareunia. Anecdotal reports suggest benefit in reducing anxiety or systemic inflammation, but more targeted research is needed.[30]

## What Can We Do as a Family Physician?

Here, we have summarized the overall concept of functional sexual pain in women of reproductive age and reviewed the current state of evidence for integrative approach. As discussed, the evidence remains limited, and no gold-standard treatment has been established. Key barriers include small-scale studies, difficulty standardizing integrative treatment approaches, and a lack of consensus on outcome measures. Our conclusion is that there needs to be some structured pressure on the research community—perhaps through women's health research funders—to establish more robust and practical evidence.

Physicians should recognize these limitations and engage in open, empathetic conversations with patients. Treatment plans should be individualized in collaboration with the patient—and ideally with their partner. Many of the therapies mentioned above require specially trained personnel, facilities, or devices, and are not easily implemented in a primary care setting. However, it remains crucial for primary care providers to stay informed about emerging evidence, know their local referral resources, and help patients access the best available options for this often-debilitating condition.

The first step when a patient brings up this concern is to acknowledge and validate her courage in initiating such a difficult conversation. From there, we can proceed to rule out organic causes through physical examination and appropriate laboratory or imaging studies (e.g., infection, menopause, endometriosis). After ruling these out, we can begin by advising the patient to avoid vulvar irritants, maintain gentle hygiene with water and mild soap, use preservative-free emollients, ensure adequate lubrication during intercourse, and avoid practices such as using hair dryers or overusing ice packs, which may worsen irritation.[31]

Simultaneously, we can offer the patient a short pain diary with time-based and location-based charts to track symptoms. Reviewing these entries at each visit allows for pattern recognition, progress monitoring, and therapeutic dialogue.

Although our tools in primary care may be limited, simply creating a space where pain is acknowledged, encouraging open discussion with a partner, and documenting and visualizing the pain experience can have therapeutic value. [32] These actions, when taken in a non-invasive and supportive manner, contribute meaningfully to the healing process.

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# A New Frontier for an Old Medicine:
## Acupuncture in the Treatment of Long COVID

*By Jillian Cohen, MD and David Foster, LAc*

In the second year of the pandemic, I spoke with a patient—Beth, forty-six, a former marathon runner—who found herself suddenly breathless walking from the kitchen to the couch. Her blood work came back normal. So did her chest X-ray, her echocardiogram, and neurological exam. "I haven't been able to think straight in six months. I can barely breathe," she said behind tearing eyes. "And they say there's nothing wrong with me." So, what do we give to someone who has no diagnosis?

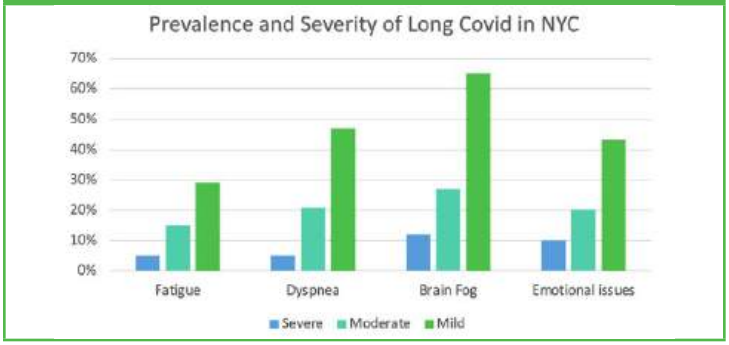
She's not alone. Primary care physicians in New York have seen their fair share of Long COVID patients—those who cycle through specialists and inconclusive tests, only to eventually end up back in their office, still looking for relief. According to the CDC, nearly one in twenty American adults are living with Long COVID, and a quarter of them describe their symptoms as debilitating. According to the **NYC Health Panel COVID-19 Experiences Survey (Nov–Dec 2022)**, a substantial number of residents believe they have Long COVID, even if undiagnosed.[1] See Figure 1.

It is a condition with no consistent lab marker, no definitive test. And yet its manifestations are unmistakably real: fatigue, brain fog, heart palpitations, chest tightness, depression, almost anything under the heading of dysautonomia, implicating the autonomic nervous system, which is precisely the information center through which acupuncture communicates.[2]

Modern medicine excels at emergencies. We are trained to act swiftly and decisively. We intubate, prescribe antivirals, and save lives. But what do we do when the emergency ends—and the suffering doesn't?

Most people associate acupuncture with pain management—something niche for back, neck, or shoulder injuries. Those more open minded or desperate might resort to it for fertility or elusive internal conditions that get labeled as "idiopathic" or "just stress." But few consider Chinese medicine in the context of acute viral illnesses—or in their lingering aftermath, as seen in Long Covid. Historical literature and modern evidence suggest that perhaps we should.

**Figure 1: Post-Acute Symptoms After Covid-19**




Source: NYC Health Panel Covid-19 Experiences Survey November-December, 2022[3]

### The Layers of Illness

Classical Chinese medicine traces its lineage to the Han Dynasty, a period marked by warring states and recurring epidemics, inspiring a demand for healing modalities to address acute crises and their sequelae. One of the medicine's foundational texts, *The Treatise on Cold Damage*, outlines a model of disease progression through six internal "conformations"—a physiological topography by which external pathogens travel inward, disrupting one system after another. See Figure 2.

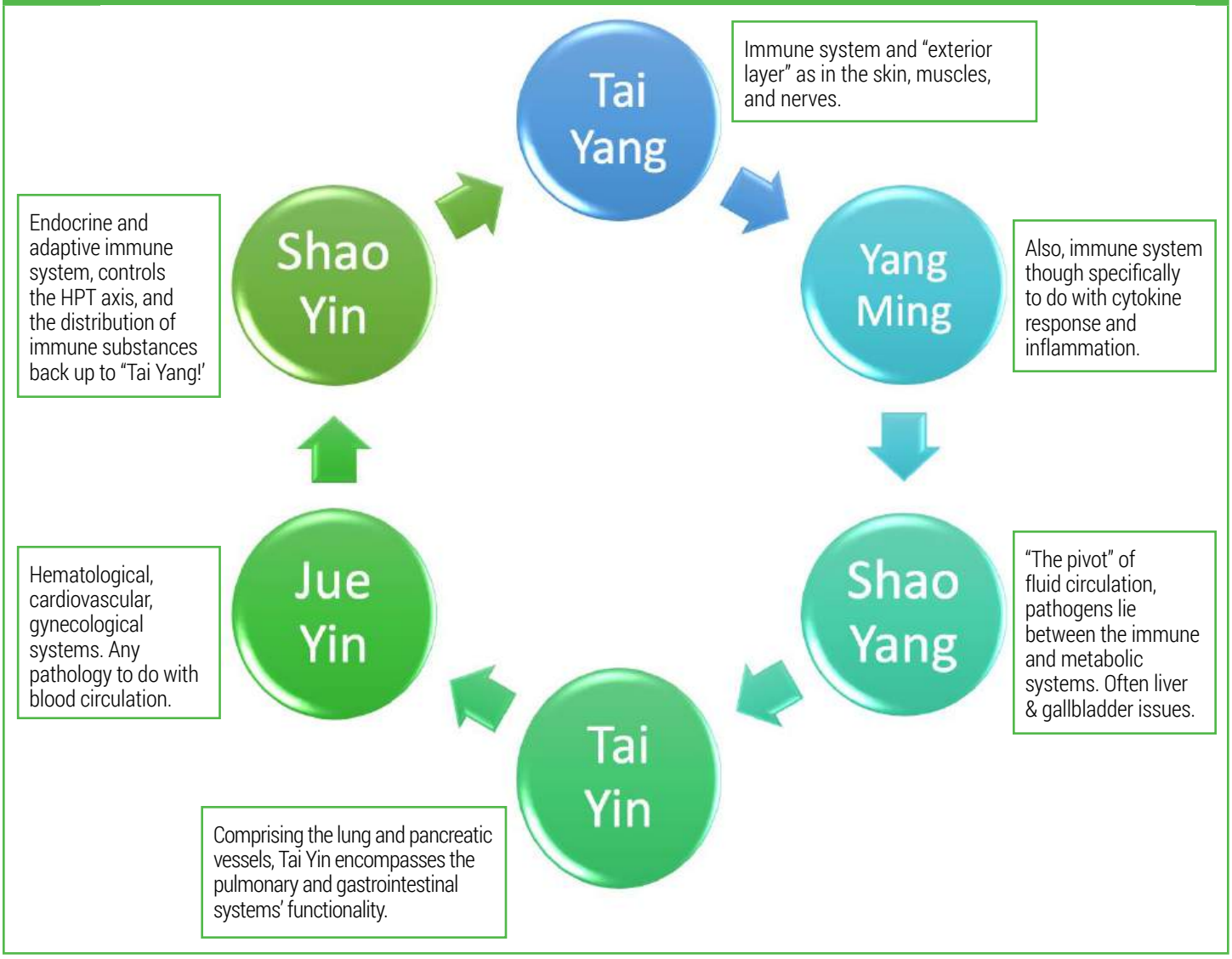
The first layer, *Tai Yang*, is thought to represent our outermost defenses—akin to the skin, the muscles, immune and nervous system. When an external virus strikes, it is here the battle is hypothesized to both begin and hopefully end. Senior clinicians and scholars of (Chinese) medicine relentlessly remind their students that over half of their "bible," *The Treatise on Cold Damage*, is devoted to the diagnosis and treatment of this "Tai Yang layer," thereby emphasizing two critical points:

1. Their paradigm of medicine was founded upon the treatment of acute viruses.
2. Unresolved acute illness often underlies chronic disease. Long Covid, or "*Long anything*," is ultimately a failure of the immune layer to resolve the initial pathogenic assault, resulting in its deeper penetration, inciting dysregulation across multiple systems—neurological, gastrointestinal, cardiovascular, or others—thereby underscoring our interconnected physiology via a system of longitudinal fluid circulation that begins by descent from none other than the lungs. It's no wonder an assault on them can have such far-reaching systemic effects.

### Moving the Needle

Acupuncture is clinically proven to alleviate some of Long COVID's most common complications, such as dyspnea,[4] brain fog,[5] chronic fatigue,[6] and depression.[7] One of the most important vessels in treating (Jue Yin) conditions of the chest is that of the pericardium. In 2023, China Medical University in Taichung, Taiwan conducted a study of fifty-one healthy adults, applying laser acupuncture at the sixth point on the pericardium vessel, *Neiguan* or "PC6," located along the median nerve two inches above the wrist. Two resting state fMRI scans showed that by stimulating this nerve it can modulate the hypothalamus and cause an inhibition of cardiac sympathetic neurons in the rostral ventrolateral medulla, a region of the brainstem involved in regulating blood pressure and the sympathetic nervous system.[8]

**Figure 2: "Six 'Conformations' of Disease, designed by Dr. Jillian Cohen and David Foster, LAc**




The same university in Taichung also demonstrated on fMRI in 2018 that "Pericardium 6" can affect the brain's default mode network (DMN) and increase connectivity with the midbrain's periaqueductal gray matter.[9] This can treat dissociative consciousness, disorders of wakefulness, depression, and brain fog, all of which are commonly seen in Long Covid, either as the chicken or egg of malfunction. For patients like Beth, with chest symptoms and dysautonomia, this is not a minor observation.

Keeping in mind that the gut is the axis through which this inflammatory cycle revolves, it is important for acupuncturists to support gastrointestinal function. "Stomach 36" is a point located on the anterior border of the tibia, shown to connect to the gastric vessel via the vagus nerve, and found to have a modulatory effect—either inhibitory or excitatory—dependent upon the pre-existing state of the patient's digestive baseline.[10]

At Kyung Hee's Department of Medicine in 2017 in Seoul, Korea, a study of twenty-seven healthy participants concluded that electroacupuncture (EA) at points, Pericardium 6, Stomach 36, as well as "Pericardium 5" and "Stomach 37," may prevent ischemia-reperfusion-induced endothelial dysfunction via a COX-2 dependent mechanism.[11] This is consistent with the Chinese medical perspective that suspects hyperpermeability of capillary walls, easy bruising, or bleeding as common complications of weakness in digestive mitochondria failing to contain blood within its vessels. By strengthening the body's "qi," or functional gases, acupuncture can improve metabolic function, engender more fluids and naturally occurring enzymes, and provide organs with enough mitochondria to resolve the original pathogen.

Once the gut's operations are improved, the next intention is to transport healthy substances upwards, towards other organs as well as the brain. For this acupuncture employs a point located at the highest point of the head's vertex, "Du ('*doo*') 20," the 20th point along the "Governor's Vessel," which runs along the spine and up through the occipital and parietal lobe. It is commonly used in conjunction with frontal lobe points to treat symptoms such as brain fog or depression. Modern research suggests that part of the reason for the point's efficacy is because of the volume and functionality loss in the parietal lobe that is apparent in both Bipolar Disorder (BP) and Major Depressive Disorder (MDD).[12] In conjunction with "Stomach 36" and other points around the

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abdomen, we can treat patients *holistically*, which is to say, multiple interrelated systems at once, and turn their vicious (longitudinal) cycle of blockage and inflammation into a virtuous one of circulation and regeneration.

**Depiction of the various lobes of the brain and cranial nerve pathways traversed by classical acupuncture vessels. *Photo from Pixels.com, Juan Antonio Garcia Filoso Rodriguez, June 4, 2023***

## Beyond Acupuncture

Historically, Chinese herbs are as integral to the medicine as acupuncture, although they remain less formally recognized and popularly accepted in Western society. Part of the reason for this is a presumed unfamiliarity, although the use of licorice for acid reflux, ginger for nausea, cinnamon to warm the vessels and improve circulation, or mushrooms to reduce inflammation, are all ideas and ingredients borrowed from classical Chinese medicine.

There are countless classical formulaic combinations to pair with acupuncture point prescriptions based on the impacted system/level, but in the table below we will attempt to simplify by empirically equating symptoms with the appropriate points and herbal formulas.

## Conclusive Collaboration

There is a great deal conventional medicine has to offer COVID long haulers, and I am proud and grateful to have seen improvement with many of my own patients through modern research and methodologies. Though on some days it feels like there are just as many who I have been unable to help, for whom I require just as much assistance as they do.

Long COVID-19 remains a weekly, if not daily issue seen in primary care offices, that is unlikely to disappear as long as "covid and flu season" continue to etch their command over our fall and winter months. As more and more patients come to us for answers to confounding questions and uniquely varied presentations, it is increasingly important that we think outside the box.

Medicine has always been an act of translation. Between symptoms and science, data and meaning. In moments like this—when our usual tools sometimes fall short—it also becomes an act of humility. With an ancient system that was predicated on such viruses and increasingly more modern evidence to support it, we are well advised to work in concert with Chinese medicine and acupuncturists who have experience treating post-viral sequelae.

When I think of Beth now, I think less of the treatments I offered her and more of her determination. There was no cure. But there was curiosity and time. There was an open mind and a willingness to not give up, both of which are integral to all expressions of recovery.

**Figure 3: Conformation Diagnoses and Empirical Prescriptions by Symptom Presentation**

| Symptomology | Affected System | Rx: Herbs & Acupuncture Points |
|---|---|---|
| Sinus congestion, headache, sweat or lack of, chills, fever | Tai Yang | *Ma Huang Tang* or *Gui Zhi Tang*<br>Li4, Lu7, Du14, Du16, Si3, Gb20 |
| High fever, excess sweat, thirst for cold, constipation | Yang Ming | *Bai Hu Jia Ren Shen Tang*<br>Li4, Li11, St36, St44, Du14 |
| Cough, dry throat, chest pain, lack appetite, digestive issues | Shao Yang | *Xiao Chai Hu Tang*<br>Tb2, Tb5, Gb34, Gb31, Cv12, Cv22 |
| Gastrointestinal complaints, shortness of breath, brain fog | Tai Yin | *Sha Shen Mai Men Dong Tang*<br>Lu5, Lu9, Sp9, Sp3, Cv12, St36, Du20 |
| Alternating feeling hot/cold, Dry skin/orifices, migraines, palpitations | Jue Yin | *Wen Jing Tang*<br>Pc6, Pc3, Lr3, Lr8, Du20, Gb41, St43 |
| Exhaustion, sensitive to cold, autoimmune complaints | Shao Yin | *Jin Gui Shen Qi Wan*<br>Sp9, Lu5, Kd7, Ub23, R4, Du4 |

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# Curcumin for Depression and Anxiety: A Narrative Review of Current Clinical Evidence

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## Introduction

Major depressive disorder (MDD) affects approximately 280 million people worldwide, making it one of the most prevalent mental health conditions.[1,2] Depression is associated with substantial health burdens, including increased mortality risk and an estimated annual financial cost of $92.7 billion in the U.S. alone.[3,4] Notably, about half of individuals with MDD also experience comorbid anxiety, which further reduces quality of life and worsens treatment outcomes.[5]

With growing global interest in natural remedies, phytochemicals—bioactive compounds derived from plants—have been increasingly studied for their potential therapeutic benefits. Among phytochemicals, curcumin has gained particular attention for its anti-inflammatory and antioxidant properties, making it a candidate for adjunct treatment in chronic conditions such as arthritis, diabetes, inflammatory bowel disease, and cancer.[6,7] Over the past decade, multiple clinical trials and meta-analyses have investigated curcumin's antidepressant effects. This review aims to summarize the current evidence of curcumin as a potential treatment for MDD.

## Methods

PubMed and Embase were the databases used to identify relevant studies. Search terms included *(curcumin OR turmeric) AND (depression OR anxiety)*. The inclusion criteria focused on randomized controlled trials (RCTs) and meta-analyses published between 2013 and 2023.

Eligible studies met specific participant and intervention criteria. Participants were either diagnosed with major depressive disorder (MDD) or included in meta-analyses with similar selection criteria. The primary intervention under investigation was curcumin, administered in various forms and doses. In many cases, curcumin was supplemented with bioavailability enhancers such as piperine or saffron to optimize absorption and effectiveness.[8,9] Selected studies assessed curcumin's efficacy compared to control groups, which involved standard care with curcumin supplementation versus standard care with a placebo.

The primary outcome measure in these studies was the effect of curcumin on depressive symptoms, assessed using standardized rating scales, including the Hamilton Rating Scale for Depression (HAM-D), Beck Depression Inventory (BDI), and Montgomery–Åsberg Depression Rating Scale (MADRS).

## Clinical Findings: Characteristics of Included Studies

Most clinical trials analyzed in this review were randomized controlled trials (RCTs) with parallel-group designs, with one study incorporating a crossover design.[10] The dosage of curcumin varied widely, ranging from 80 mg to 1,500 mg, with treatment durations spanning 30 days to 12 weeks.[8,10,12] Study populations all included participants with symptoms of MDD.

This review also included four meta-analyses published within the last decade, each synthesizing clinical trials on curcumin's efficacy in MDD treatment by enhancing the validity of findings and providing a more comprehensive understanding of curcumin's therapeutic potential for MDD.

## Biochemical Findings: Proposed Mechanisms of Curcumin for MDD and Comorbid Anxiety

One of the primary pathways by which curcumin may alleviate symptoms of depression and anxiety is through anti-inflammatory and antioxidant activity.[13] Chronic inflammation and oxidative stress are closely linked to depression and anxiety, leading to neural damage and impaired brain function. Curcumin reduces inflammation by inhibiting pro-inflammatory cytokines such as IL-1 and IL-6, which are typically elevated in individuals with MDD and anxiety disorders.[14] Additionally, curcumin enhances neuronal protection by scavenging free radicals and boosting antioxidant activity.[14]

Another key mechanism is curcumin's role in neurotransmitter modulation. It increases the availability of serotonin, dopamine, and norepinephrine by inhibiting monoamine oxidase (MAO-A), an enzyme responsible for breaking down these neurotransmitters.[15] This mechanism is similar to that of conventional antidepressants, though curcumin's low bioavailability may suggest a safer pharmacological profile compared to pharmaceutical MAO inhibitors.

Curcumin also promotes neurogenesis by enhancing the expression of brain-derived neurotrophic factor (BDNF), a protein essential for neuronal survival and plasticity. Reduced BDNF levels have been implicated in MDD, particularly in the hippocampus, a brain region critical for mood regulation.[16] A study by Huang et al. found that curcumin (20 mg/kg/day) increased BDNF expression in the hippocampus and frontal cortex, reversing depressive-like symptoms in corticosterone-induced depressive rat models.[16] Additionally, curcumin has been shown to modulate cortisol levels and improve HPA axis function, thereby reducing the physiological effects of chronic stress.[17] Through these combined mechanisms, curcumin presents a promising natural approach to managing depression and anxiety, though further clinical research is necessary.

## Dosing of Curcumin: Investigating Bioavailability

Curcumin, desmethoxycurcumin, and bisdemethoxycurcumin are in the curcuminoid class of phytonutrients and are the main chemical constituents of turmeric. Of the curcuminoids, curcumin is the most abundant curcuminoid in turmeric and, therefore, the most studied. However, some studies had slightly different formations of curcumin (Table 1).

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**Table1. Clinical Trial Findings: Examining the Efficacy of Curcumin for MDD and Anxiety**

| Title | Sample Size | Control/Placebo | Intervention | Principle Finding | Country and Year | Duration |
|---|---|---|---|---|---|---|
| Curcumin for the treatment of major depression: a randomized, double-blind, placebo controlled study[20] | 56 patient with MDD | Placebo (cellulose) | Curcumin was provided in a 500mg capsule (BCM-95®) containing total curcuminoids 88% (curcumin, bisdemethoxycurcumin, demethoxycurcumin) and volatile oils 7% from rhizomes of Curcuma longa Linn | Treated with curcumin (500mg twice daily) or placebo for 8 weeks. During 4 to 8 weeks, curcumin was significantly more effective than placebo in improving several mood-related symptoms (p=.045). Curcumin helped more with the subgroup of a typical depression. | Australia-2014 | 8 weeks |
| Efficacy and safety of curcumin in major depressive disorder: a randomized controlled trial[29] | 60 patients with MDD | Fluoxetine 20mg/day alone | Three groups: group I received fluoxetine 20mg/day in the morning, group II received curcumin1000mg/day (500mg BD), while group III received fluoxetine 20mg/day and curcumin 1000mg/day (500mg BD) | MDD patients were randomized in a 1:1:1 ratio with fluoxetine (20mg) and curcumin (1000mg) individually or their combination. Mean change in HAM-D17 score at the end of six weeks was comparable in all three groups (P = 0.77). This study provides clinical evidence that curcumin may be used as an effective and safe modality for treatment in patients with MDD without concurrent suicidal ideation or other psychotic disorders. | India-2014 | 6 weeks |
| An investigation of the effects of curcumin on anxiety and depression in obese individuals: a randomized controlled trial[10] | 30 obese subjects with MDD | Placebo capsules matched in size and shape and contained bioperine® (5mg) | C3 Complex® 1g/day | The mean Beck Anxiety Inventory score was found to be significantly reduced following curcumin therapy (P=0.03). Curcumin has a potential anti-anxiety effect in individuals with obesity. | Iran-2015 | 30 days<br>2-week washout<br>Cross over for 30 days |
| Chronic supplementation of curcumin enhances the efficacy of antidepressants in major depressive disorder: a randomized, double-blind, placebo-controlled pilot study[31] | 108 males with MDD | Placebo comprised soybean powder in a capsule with the same yellow form as curcumin | The curcumin powder was composed of curcumin (70%), demethoxycurcumin (20%), and demethoxycurcumin (10%). Curcumin was taken in capsule form at a weight of 500mg per capsule | Chronic supplementation with curcumin produced a significant antidepressant behavioral response in depressed patients by reduction of 17-item Hamilton Depression Rating Scale and Montgomery-Asberg Depression Rating Scale score (P< 0.05). Curcumin decreased inflammatory cytokines interleukin 1β and tumor necrosis factor α levels, increased plasma brain-derived neurotrophic factor levels, and decreased salivary cortisol concentrations compared with the placebo group. | China-2015 | 6 weeks |
| Investigation of the efficacy of adjunctive therapy with bioavailability-boosted curcuminoids in major depressive disorder[9] | 111 patients with MDD | Standard medical therapy | Curcuminoids (C3 Complex®, Sami Labs LTD, Bangalore, India)were administered at a daily dose of 1000mg plus 10mg piperine (Bioperine®; Sami Labs LTD, Bangalore, India) | There were significantly greater reductions in total HADS score and subscales of anxiety and depression in the curcuminoids versus the control group (p<0.001). Likewise, reductions in BDI-II total score and scores of somatic and cognitive subscales were found to be greater in the curcuminoids compared with the control group (p<0.001) | Iran-2015 | 6 weeks |
| Efficacy of curcumin, and a saffron/curcumin combination for the treatment of major depression: a randomized, double-blind, placebo-controlled study[7] | 123 patients with MDD | (Group 1) placebo, (Group 2) low-dose curcumin containing 250mg of the patent curcumin, BCM-95® (LDC), (Group3) high-dose curcumin containing 500mg of BCM-95® (HDC), and (Group 4) low-dose curcumin/saffron combination, containing 250mg of BCM-95® and 15mg of saffron (LDC+S) | Curcumin used in the capsules was derived from BCM-95®, which contains total curcuminoids 88% (curcumin, bisdemethoxycurcumin, demethoxycurcumin) and volatile oils 7% from rhizomesofCurcumalongaLinn.Saffron(affron®)was derived from the stigmas of Crocussativus L. and is standardized to contain >3.5% Lepticrosalides® (a measure of bioactive compounds present in saffron, including safranal and crocin). | Active drug treatments (combined) were associated with significantly greater improvements in depressive symptoms compared to placebo (p=.031), and superior improvements in STAI-state (p<.001) and STAI-trait scores (p=.001) | Australia- 2017 | 12 weeks |
| Add-on treatment with curcumin has antidepressive effects in Thai patients with major depression: results of a randomized double-blind placebo-controlled study[12] | 65 patients with MDD | 250mg placebo (cellulose) capsules, identical in appearance to curcumin capsules | Curcumin was delivered in 250mg capsules together with identical placebo capsules.The GPO compound preparation consisted of curcuminoids 100%, namely curcumin 77%, demethoxycurcumin 17%, and bisdemethoxycurcumin 6% | Randomized to receive either adjunctive curcumin (increasing dose from 500 to 1500mg/day) or placebo for 12 weeks. Curcumin was more efficacious than placebo in improving Montgomery-Asberg Depression Rating Scale scores, with significant differences between curcumin and placebo emerging at weeks 12 and 16 (p<0.05). More pronounced benefit in males | Thailand-2018 | 12 weeks |
| Beneficial effects of nano-curcumin supplement on depression and anxiety in diabetic patients with peripheral neuropathy: a randomized, double-blind, placebo-controlled clinical trial[11] | 80 patients with T2DM and MDD | Placebo capsules composed of polysorbate [8] | 80mg curcumin: to enhance bioavailability, nano-curcumin supplements consisted of curcumin 72%, desmethoxycurcumin 25%,and bisdemethoxycurcumin3% | After intervention, there was a significant reduction in the mean score of depression in the nano-curcumin group (p = .02) and anxiety compared with the placebo group (p=.009). Stress scores were not statistically significantly different. | Iran-2020 | 8 weeks |
| The effect of adding curcumin to sertraline in the treatment of severe major depressive disorder: a randomized,double-blind clinical trial[21] | 45 patients with severe MDD | Placebo with the same shape and taste as curcumin | 40mg/d (equal to 400mg of curcumin) in 2 divided doses per day | Adding 40mg/d of SinaCurcumin to sertraline as a routine medical regimen did not improve the depression and anxiety levels in severe MDD patients (P > 0.05). However, the anxiety score was lower in the intervention group than in the placebo group, which suggests curcumin may have a greater effect on anxiety. | Iran-2023 | 8 weeks |

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The optimum dosage of curcumin as therapy for MDD remains variable. Recent studies have utilized doses ranging from 80 mg/day to 1,500 mg/day, with both regimens demonstrating significant symptom improvement despite their discrepancies in dosage.[11,12] A 2016 meta-analysis by Al-Karawi found that curcumin's antidepressant effects were most pronounced when administered at higher doses ($p = 0.002$), for longer durations ($p = 0.001$), and in middle-aged participants ($p = 0.002$).[18] This finding is contradicted by Lopresti and Drummond (2017), who found no significant differences in symptom reduction between the low-dose curcumin, high-dose curcumin, or low-dose curcumin plus saffron (bioavailability enhancer) groups.[8] Regardless of dosing, curcumin-treated groups exhibited significant improvements in depressive symptoms compared to placebo ($p = 0.03$).[8] This suggests that while most studies utilize dosing of approximately 1,000mg daily, benefit is attainable at lower supplementation levels.

The wide variation in dosing efficacy may be attributed to changes in formulation and the use of bioavailability enhancers. Combining curcumin with piperine (from black pepper) has been shown to significantly enhance bioavailability by improving absorption and prolonging retention in the body.[19] Panahi et al. (2015) investigated a formulation containing 1,000 mg/day of C3 Complex® (curcuminoids) combined with 10 mg of Bioperine® (piperine).[9] They found that this combination significantly reduced MDD symptoms compared to a placebo plus standard therapy ($p < 0.001$).[9] However, the absence of a curcumin-only treatment arm limits the ability to determine the precise clinical significance of piperine as a bioavailability enhancer and whether its addition improved clinical outcomes.

## Current Evidence on the Effectiveness of Curcumin on Depressive Symptoms

Recent clinical trials and meta-analyses have evaluated curcumin as an adjunctive therapy alongside standard MDD treatments. These studies provide valuable insights into curcumin's therapeutic potential and its integration into clinical practice (Table 1).

### *Clinical Trials on Curcumin as MDD Therapy*

Lopresti et al. (2014) conducted one of the earliest trials investigating curcumin's efficacy in MDD treatment. Participants were given either 500 mg of curcumin twice daily or a placebo for eight weeks. From weeks 4 to 8, curcumin showed significantly greater improvements in mood-related symptoms compared to placebo.[20] Notably, the study found enhanced efficacy in individuals with atypical depression, a subtype of depressive disorders characterized by increased sleep, increased appetite, and interpersonal rejection sensitivity.[20] This research highlights the possibility that certain subtypes of MDD may respond more favorably to curcumin supplementation.[20] After this study, subsequent RCTs started to use curcumin as adjunctive therapy to the standard of care rather than curcumin alone. Standard of care varied between subsequent studies but generally consisted of medication therapy (i.e. SSRI, SNRI).

Additional support for the curcumin's clinical impact comes from Panahi et al.[9] Their group examined the use of 1000mg/day of curcumin with 10 mg/day piperine in patients with MDD.[9] This combination therapy significantly reduced MDD symptoms compared to placebo ($p < 0.001$) over 6 weeks.[9] Similarly, Kanchanatawan et al. conducted a 12-week RCT in which participants received either a placebo or curcumin with an increasing dose (starting at 500 mg/day, escalating to 1,500 mg/day by week 4).[12] The study found significant symptom improvement

**Table2.Meta-Analysis Findings: Summarizing the Role of Curcuminin MDD and Cognitive Function**

| Title | Year | Number of Studies | Principle Finding |
|---|---|---|---|
| The role of curcumin administration in patients with major depressive disorder: mini meta-analysis of clinical trials[18] | 2016 | 6 studies-<br>342 patients | Overall, curcumin administration showed a significantly higher reduction in depression symptoms (p=0.002). Subgroup analyses showed that curcumin had the highest effect when given to middle-aged patients, for a longer duration of administration, and at higher doses. |
| Clinical use of curcumin in depression: a meta-analysis[22] | 2017 | 6 studies-<br>377 patients | Standardized mean difference from baseline Hamilton Rating Scale for Depression scores supports the significant clinical efficacy of curcumin in helping to alleviate depressive symptoms (p=0.002). |
| Curcumin intervention for cognitive function in different types of people: a systematic review and meta-analysis[23] | 2019 | 6 studies-<br>289 total patients | For older adults who received curcumin, scores on measures of cognitive function, occurrence of adverse events, and measures of depression indicated significant memory improvement. In patients with Alzheimer's disease (AD), scores in measures of cognitive function improved with curcumin. |
| Curcumin for depression: a meta-analysis [24] | 2020 | 15 studies-<br>531 total patients | Significant effect of curcumin on depressive (p<0.001) and anxiety symptoms (p<0.001). Curcumin was generally well-tolerated by patients.Findings suggest that curcumin, if added to standard care, might improve depressive and anxiety symptoms in people with depression. |
| Flavonoids for depression and anxiety: a systematic review and meta-analysis[32] | 2023 | 11 studies | Meta-analysis showed that flavonoids have an overall significant effect on depression (p=0.004) and anxiety (p=0.006).Symptoms of depression were significantly improved when the dose of flavonoids was 50-100mg/day or study duration was grater than 8 weeks. |

by week 12, with curcumin's benefits persisting for four additional weeks after discontinuation.[12] This suggests a sustained therapeutic impact, positioning curcumin as a potential long-term adjunctive treatment for MDD. Additionally, curcumin appeared to be more effective in male participants, warranting further investigation into potential gender-specific responses.[12]

However, not all of the limited existing studies have been so supportive of curcumin's efficacy. The recent 2023 RCT by Talaei et al. examined curcumin's effectiveness when combined with the antidepressant sertraline. Participants were randomized to receive either 40 mg/day of SinaCurcumin (a curcumin formulation) or placebo in addition to sertraline.[21] The study found no significant improvement in depression or anxiety levels among patients with severe MDD receiving curcumin, suggesting that curcumin may be less effective in severe cases when added to standard antidepressant therapy.[21]

### *Meta-Analyses on Curcumin's Antidepressant Effects*

Existing meta-analyses have also found mixed results on curcumin's overall efficacy in treating MDD (Table 2). Ng et al. (2017) found that available clinical trials support curcumin's antidepressant properties while also highlighting its safety and tolerability, as no major adverse effects were reported across the studies analyzed.[22] However, due to the limited number of clinical trials available at the time, their meta-analysis was partially constrained. Zhu et al. (2019) investigated curcumin's impact on cognitive function and its potential antidepressant effects. Their findings revealed no significant reduction in MDD symptoms ($p = 0.86$).[23] However, they noted improvements in memory and cognitive function in patients with Alzheimer's disease, suggesting that curcumin's clinical benefits may extend beyond depression treatment.[23]

## Current Evidence on the Effectiveness of Curcumin on Anxiety Symptoms

Anxiety is a common comorbidity of MDD, prompting recent studies to explore the effectiveness of curcumin in alleviating anxiety symptoms (Tables 1 and 2).[10,11,24] One such study, conducted by Esmaily et al. in 2015, investigated the impact of curcumin on anxiety and depression in obese participants. This crossover study included 30 participants who received either 500 mg of C3 Complex® curcumin plus 5 mg of Bioperine® (to enhance bioavailability) twice daily or a placebo with Bioperine®.[10] While curcumin did not significantly affect depression scores, it led to a significant reduction in anxiety levels ($p<0.05$).[10] These findings suggest that curcumin may alleviate anxiety symptoms in the broader MDD spectrum, particularly in obese populations.

A recent clinical trial by Asadi et al. further examined the effects of curcumin on anxiety and depression in 80 patients with type 2 diabetes. Participants received either 80 mg of nano-curcumin or a placebo daily for eight weeks. Nano-curcumin, which contains curcumin (72%), desmethoxycurcumin (25%), and bisdemethoxycurcumin (3%) to improve bioavailability, was associated with significant reductions in both depression ($p = .02$) and anxiety ($p = .009$) symptoms compared to placebo. However, stress score reductions were not statistically significant.[11]

The 2019 meta-analysis by Fusar-Poli et al. examined five studies with a total of 284 participants and found a significant effect of curcumin in reducing anxiety symptoms when used as adjunctive therapy ($p < 0.001$).[24] By synthesizing data from multiple trials, the meta-analysis provided compelling evidence for curcumin's potential as a complementary intervention for anxiety. These findings reinforce the growing interest in curcumin as a natural therapeutic option for mental health conditions.

Despite promising results, curcumin's efficacy in reducing MDD and anxiety symptoms remains inconsistent, likely due to variations in dosage, duration, and study populations. Notably, the two RCTs on anxiety focused on obese and type 2 diabetic individuals, possibly introducing bias.[10,11] Broader research across diverse populations- including studies that account for gender differences - is needed to clarify its therapeutic potential across varying demographics.

## Comparison of Curcumin to Standard Treatments

The current standard of care for MDD includes various pharmacological treatments. Commonly prescribed antidepressants include: SSRIs, SNRIs, atypical antidepressants, and less commonly tricyclic antidepressants (TCAs) and monoamine oxidase inhibitors (MAOIs). Common side effects of traditional MDD treatment are varied but include worsened anxiety, insomnia, sexual dysfunction, weight gain, and rarely dangerous cardiovascular and neurological complications such as seizure and serotonin syndrome.[13,25,26,27] In comparison, curcumin appears to have few side effects in individual studies and direct comparisons to standard treatment. A study by Lao et al. reported mild side effects in 30 percent of participants, including diarrhea, headache, rash, and yellow stool, when receiving curcumin as high as 12,000 mg, without severe complications.[28]

Similarly, Sanmukhani et al. found that 1000 mg/day of curcumin alone was as effective as fluoxetine (20 mg/day) in reducing MDD symptoms ($p = 0.77$) over six weeks without significant side effects.[29] However, the combination of fluoxetine and curcumin did not show superior benefits compared to either treatment alone.[29] These findings suggest curcumin could serve as an alternative or adjunctive treatment for MDD, which may be better tolerated than traditional medications.

The side effect profile of curcumin however, needs further investigation. Although curcumin seems to be well tolerated, it may increase bleeding risk, especially when taken in high doses or combined with anticoagulant or antiplatelet medications.[30]

## Issues with Current Literature

Despite recent advancements in research for curcumin as an adjunctive therapy for MDD, several limitations persist. Notably, all studies included in our review were conducted outside the United States, with significant contributions from Australia, Asia, and the Middle East (Table 1). While this global perspective provides valuable insights from diverse patient populations, the lack of U.S.-based studies may limit generalizability. Additionally, many studies had small sample sizes, such as 30 or 56 participants,

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reducing their statistical power and broader applicability.[10,20] Expanding sample sizes and diversifying study populations will be crucial for strengthening the validity of future research.

Another key limitation is the study duration. The length of curcumin administration ranged from 30 days to 12 weeks. Some of these study durations may not be sufficient for curcumin to exert its full therapeutic potential.[8,10,12] For instance, Lopresti et al. found that curcumin (1000 mg/day) did not show significant effects compared to placebo until weeks four to eight, suggesting that longer study durations may be necessary to assess its benefits fully.[20] Future research should extend treatment periods to explore the long-term efficacy and sustainability of curcumin's effects.

Additionally, when recommending supplements to patients, family physicians should be aware of the lack of federal oversight, which pose risks for over-the-counter supplements not reflected in current curcumin research. Family physicians should inform patients that supplements in the United States are not regulated by the Food and Drug Administration for safety, efficacy, or consistency; however, supplements may be voluntarily certified by private organizations such as United States Pharmacopeia to ensure quality. Therefore, curcumin supplements should currently be used with caution, as variations in formulation and dosage may affect therapeutic effectiveness. For patients with preferences for alternative medicine, family physicians can counsel patients to obtain supplements through verified sources and inform them of possible side effects.

## Conclusion

Given the widespread impact of MDD, expanding treatment modalities in the primary care setting is essential. Curcumin's anti-inflammatory and antioxidant properties may offer a unique mechanism for addressing MDD, particularly in individuals with obesity, type 2 diabetes, or other chronic conditions.[10,11] Despite the recent promising research on curcumin as therapy for MDD, several limitations persist. Notably, all studies included in our review were conducted outside the United States, which limits generalizability. Additionally, many studies had small sample sizes, used a wide variety of formulations, and had relatively short durations. Furthermore, some research has recommended the use of natural form of curcumin found in turmeric-rich foods; however, most clinical trials solely focus on supplemental curcumin in concentrated tablets due to higher potency and bioavailability. While current research is promising, at this time, there is not enough evidence to provide robust recommendations or guidelines for the regular use of curcumin for MDD in primary care practice. Further research is necessary to elucidate curcumin's mechanisms of action, refine dosage recommendations, explore its side effect profile, and confirm its long-term benefits, paving the way for its safe and effective use in patients with MDD.

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# Integrative Medicine Approach to Sleep Optimization: A Toolkit for Primary Care

*By Carolyn Kwa, DO and Sarin Itty, DO*

Sleep – alongside nutrition, social connections, stress management, and physical activity – comprise the foundational pillars of health. However, most of us are not giving sleep enough attention, providing insufficient counseling and education on the importance of sleep until sleep disorders arise. Sleep is far from a passive activity; tremendous biological processes are taking place while we "rest."

A recently discovered macroscopic waste system in the brain named the "glymphatic system" functions to clear out potentially neurotoxic waste products and also deliver essential nutrients to the brain.[1] This system is mainly active during sleep and is largely inactive during wakefulness. The dysfunction of this system has been implicated in playing a role in neurodegenerative disorders, traumatic brain injuries and strokes. Additionally, we see significant derangements in the homeostasis of our metabolic, cardiovascular, reproductive, emotional, immune, and digestive systems when poor sleep occurs. When the chief complaint of a sleep disorder arises, conventional pharmacological treatment with sedative-hypnotics and antihistamines are temporary fixes with higher likelihoods of dependence and adverse effects. A variety of modalities, including lifestyle modifications focusing on proper sleep hygiene and circadian rhythm regulation with the natural light-dark cycle, cognitive behavioral therapy for insomnia (CBTI), incorporating cognitive restructuring, psychoeducation and behavioral interventions including relaxation techniques such as mindfulness based therapies and breathwork, and supplements such as magnesium, melatonin, l-theanine, and non-habit forming botanicals like valerian root, lemon balm, and chamomile, offer patients a more sustainable and balanced approach to optimizing their sleep and health.

The National Sleep Foundation provides the following sleep duration guidelines for healthy individuals: newborns (14-17 hours), infants (12-15 hours), toddlers (11-14 hours), preschoolers (10-13 hours), school-aged children (9-11 hours), teenagers (8-10 hours), young adults and adults (7-9 hours), and older adults (7-8 hours).[2]

The Centers for Disease Control and Prevention (CDC) highlights that insufficient sleep is a public health crisis, affecting approximately one-third of U.S. adults and children under 14, and three-quarters of high schoolers.[3] This lack of sleep has consequences beyond the individual, contributing to motor vehicle accidents, workplace accidents, and medical errors. Family medicine physicians can be crucial in addressing this issue by educating patients, serving as role models, and promoting practices that foster better sleep and overall health. Lifestyle changes promoting good sleep practices, while demanding the most patient effort and commitment, offer the most effective and sustainable improvements.

## Sleep Assessment

We can help our patients make changes by first assessing their sleep quantity, quality, regularity, and timing (QQRT)- a concept coined by Matthew Walker, PhD.[4] *Sleep quantity:* how much sleep is your patient getting? Are they meeting the recommendations from the National Sleep Foundation based on their age group? *Sleep quality:* National Sleep Foundation's evidence-based recommendations on good sleep quality indicators include sleep latency, the number of awakenings, wake-after-sleep onset, and sleep efficiency (the percentage of time spent in bed actually sleeping).[5] Normal adult sleep is characterized by a sleep onset latency of 10 to 20 minutes,[5] and a sleep efficiency of 90% which is less than 45 minutes awake in 8 hours of sleep. *Sleep regularity:* the consistency of sleep-wake timing from day to day. Higher sleep regularity is associated with a 20%-48% lower risk of all-cause mortality.[6] Ideally sleep-wake time would be the same on weekdays and weekends- this time would be +/- 0-20 minutes on either side of a person's nightly sleep. *Timing:* sleeping in alignment with one's chronotype, or natural preference for timing of sleep and wake. Synchronizing sleep with the patients' chronotype (Owl, Lark, or Neutral) boosts sleep quality.[7] Chronotype is shaped by genetics, age, and environment. Modern life, especially artificial light, can shift chronotypes later, causing poorer sleep, fatigue, emotional issues, metabolic disorders, and increased substance use risks.[8]

A personalized sleep assessment questionnaire can be found on Dr. Walker's website: https://www.sleepdiplomat.com/qqrt-assessment and can be used to help patients focus on which area of their sleep QQRT needs the most attention.

## Sleep Hygiene

After identifying the patients' sleep habits and areas for improvement , encourage patients to explore and implement sleep hygiene practices to achieve their sleep goals, such as those recommended by the NIH for a good night's sleep. See Figure 1.

**Figure 1. 12 tips for Getting a Good Night's Sleep as Provided by the National Institutes of Health.[9]**

1. **Stick to a sleep schedule.** Go to bed and wake up at the same time each day—even on the weekends.
2. **Exercise is great, but not too late in the day.** Try to exercise at least 30 minutes on most days but not later than 2–3 hours before your bedtime.
3. **Avoid caffeine and nicotine.** The stimulating effects of caffeine in coffee, colas, certain teas, and chocolate can take as long as 8 hours to wear off fully. Nicotine is also a stimulant.
4. **Avoid alcoholic drinks before bed.** A "nightcap" might help you get to sleep, but alcohol keeps you in the lighter stages of sleep. You also tend to wake up in the middle of the night when the sedating effects have worn off.
5. **Avoid large meals and beverages late at night.** A large meal can cause indigestion that interferes with sleep. Drinking too many fluids at night can cause you to awaken frequently to urinate.
6. **Avoid medicines that delay or disrupt your sleep, if possible.** Some commonly prescribed heart, blood pressure, or asthma medications, as well as some over-the-counter and herbal remedies for coughs, colds, or allergies, can disrupt sleep patterns.
7. **Don't take naps after 3 p.m.** Naps can boost your brain power, but late afternoon naps can make it harder to fall asleep at night. Also, keep naps to under an hour.
8. **Relax before bed.** Take time to unwind. A relaxing activity, such as reading or listening to music, should be part of your bedtime ritual.
9. **Take a hot bath before bed.** The drop in body temperature after the bath may help you feel sleepy, and the bath can help you relax.
10. **Have a good sleeping environment.** Get rid of anything in your bedroom that might distract you from sleep, such as noises, bright lights, an uncomfortable bed, or a TV or computer in the bedroom. Also, keeping the temperature in your bedroom on the cool side can help you sleep better.
11. **Have the right sunlight exposure.** Daylight is key to regulating daily sleep patterns. Try to get outside in natural sunlight for at least 30 minutes each day.
12. **Don't lie in bed awake.** If you find yourself still awake after staying in bed for more than 20 minutes, get up and do some relaxing activity until you feel sleepy. The anxiety of not being able to sleep can make it harder to fall asleep. (NIH)

## Circadian Rhythm Regulation and Melatonin

A main component of sleep hygiene is to ensure adequate and appropriate sunlight exposure. Sunlight exposure is important for regulating the patient's circadian rhythm and key neurotransmitters involved in the sleep-wake cycle.

***Melatonin*** – the "darkness hormone" from the pineal gland which drives sleep – is quite sensitive to light. Advise patients to expose themselves to bright sunlight first thing in the morning after waking to help set their circadian rhythm. Sun lamps and bright lamp boxes – commonly prescribed for those with seasonal affective disorder – are useful for those who do not have access to sunlight or cannot physically get outside. When sunlight hits the retina, it inhibits the release of melatonin from the pineal gland and promotes the rise of cortisol, serotonin, norepinephrine, and dopamine, stimulating wakefulness. Encourage patients to get a second dose of sunlight in the afternoon/evening when the sunlight is in its red tones to promote the release of melatonin.

As darkness falls and sunlight diminishes, cortisol levels decrease. Subsequently, norepinephrine prompts the conversion of serotonin, a melatonin precursor, into melatonin, which is then released.[10] In modern society, where we have access to artificial light at all times of the day even after the sun has set, we can see why melatonin release is deterred/delayed. Artificial light is not only present from our overhead lighting but also from our screens: tv, cellphones, and computers. Exposure to these sources of blue light has a large negative impact on sleep, and adolescents are particularly sensitive to the effects of this.[11] With the suppression of melatonin, cortisol is allowed to increase during the night leading to increased stress, anxiety and difficulty falling asleep.[12]

As individuals age, melatonin production declines significantly. By the age of 90 and older, melatonin levels can be as low as 20% of those observed in young adults.[13] Melatonin is also produced in mitochondria and in multiple organs of the body. It functions as a free radical scavenger and powerful antioxidant.[14] It is increasingly researched as an anti-aging therapy for age-related cardiovascular and neurodegenerative diseases[15] and for its anti-cancer effects.[16]

Despite the lack of FDA approval, the American Academy of Family Physicians (AAFP) recognizes melatonin as the first-line pharmacological therapy for insomnia.[17] Dosages of melatonin as a sleep aid that have been shown to be effective are 0.3 to 5mg for adults.[18] A sustained-release formulation more closely approximates the natural pattern of release. A low-dose regular-release sublingual formulation may be useful for middle of the night wakefulness if one can remain asleep for at least 3 more hours.[19] It is recommended to take melatonin 1-2 hours before reported usual bedtime every day.

Melatonin is relatively nontoxic, although some mild adverse effects have been reported with higher doses and extended-release formulations, including drowsiness, daytime sedation, nausea, and headaches.[17] Practice caution in pediatric and geriatric patients and patients with hepatic and renal impairment. Due to insufficient evidence, avoid use during pregnancy and breastfeeding. Melatonin is contraindicated for individuals taking sedative-hypnotics and potent CYP1A2 inhibitors.

***Tips to Minimize Artificial Light in the Home*** – To limit disruption of melatonin release consider replacing bright home lights with smart lights programmable to emit only red light in the evening. Alternatively, advise patients to switch standard light bulbs in floor lamps to red light bulbs for evening use only. In the evening, change all phone and laptop device screens to a red tone. Standard "night settings" may still emit blue light. Having screens with the red filter eliminates the blue light.

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Wearing blue light blocking glasses in the late afternoon/evening may be helpful to filter out ambient blue light as well. For those who enjoy reading in the evening, they can use a clip on red book light or a lamp with a red light bulb.

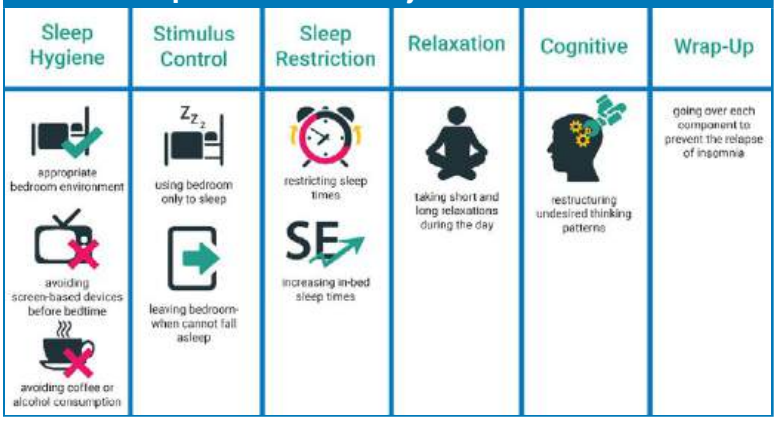
## Cognitive Behavioral Therapy for Insomnia (CBTI)

Chronic insomnia stems from predisposing factors (inherent traits like high emotional reactivity), precipitating factors (situational triggers like stress), and perpetuating factors (behaviors and thoughts sustaining the condition).[20]

CBTI is an evidence based approach to identify thoughts, feelings, and behaviors that are contributing to the symptoms of insomnia. Treatment often takes from 6-8 sessions and the American College of Physicians recommends that all adult patients receive CBTI as a first-line approach.[21] While it may be difficult finding practitioners trained in CBTI, there are opportunities for self-motivated patients to use online resources such as the free app developed by The Department of Veterans Affairs called CBTI Coach.

The structured approach of CBTI includes three main components: cognitive restructuring to change inaccurate or unhelpful thoughts about sleep, psychoeducation to teach patients about sleep hygiene, and behavioral interventions to help elicit change such as stimulus-control, sleep restriction, and relaxation training.[22] See Figure 2.

**Figure 2. The structure of CBT-I components in in-person treatment. Reprinted from Erten Uyumaz B et al[22]**




***Cognitive Restructuring*** involves identifying dysfunctional sleep thoughts, examining their accuracy, and altering them to be more rational. The goal is to replace unhelpful beliefs with adaptive, sleep-promoting thoughts and to decatastrophize concerns. Example of unhelpful belief: "I need 8 hours of sleep or I won't be able to function tomorrow." Example of adaptive, sleep promoting thought: "It is not ideal but I have gotten by on 5 hours of sleep for a long time."

***Psychoeducation*** teaches the importance of good sleep hygiene to increase practices that encourage and support sleep and decrease or eliminate those that discourage sleep. The practices in Figure 1 are essential to review with patients. These skills acquired during therapy sessions necessitate consistency. Homework assignments such as maintaining a sleep diary, actively questioning automatic thoughts or beliefs as they emerge, and utilizing a sleep hygiene checklist can help to reinforce learned skills.

**Behavioral interventions** include stimulus control, sleep restriction and various relaxation techniques.

***Stimulus Control*** aims to connect sleep cues (bed, bedroom) to sleep. Good sleepers associate these with sleep, while those with insomnia may link the bedroom to wakefulness (reading, TV, lying awake), fostering poor conditions for sleep. Recommendations include: (a) only lie down when sleepy, (b) use bed only for sleep/sex, (c) leave bed if sleepless for 15-20 minutes, returning when sleepy, (d) repeat as needed, (e) wake at same time daily, and (f) avoid daytime naps. Maintain these habits post-remission.

***Sleep restriction*** addresses chronic insomnia by correcting sleep extension, the tendency to spend too much time in bed, which creates a mismatch between actual sleep and time spent attempting to sleep. The goal is to limit time in bed to actual sleep duration, boosting sleep drive and reducing sleep onset time and nocturnal awakenings.

*Steps:*

1. Assess average sleep duration: Use two weeks of sleep diaries.
2. Set prescribed time in bed (PTIB): Equal to average sleep duration.
3. Determine consistent morning rise time: Based on lifestyle.
4. Calculate prescribed time to bed (PTTB): Rise time minus PTIB.

Adjustments are made weekly based on sleep efficiency (SE%): [20]

- SE% < 85%: Reduce PTIB by 15 minutes.
- 85% ≤ SE% ≤ 90%: Maintain PTIB.
- SE% > 90%: Increase PTIB by 15 minutes.

### *Relaxation Techniques*

The National Center for Complementary and Integrative Health describes commonly taught relaxation techniques which help to promote the body's "relaxation response" which slows breathing, lowers blood pressure, and reduces heart rate, which is the opposite of the stress response.[23] These techniques include mindfulness based therapies such as progressive muscle relaxation (PMR), autogenic training, biofeedback, hypnosis, meditation and breathwork and have been found to be helpful in reducing symptoms of anxiety and worry.

Various breathwork techniques, including deep or diaphragmatic breathing and Dr. Andrew Weil's 4-7-8 method, have demonstrated positive effects. Studies have shown these techniques reduce stress and improve quality of life in post-bariatric surgery patients,[24] and alleviate anxiety, insomnia, and pain in burn injury patients.[25] Furthermore, Hopper et al. found diaphragmatic breathing significantly lowered systolic and diastolic blood pressure, salivary cortisol levels, respiratory rate, and perceived stress.[26]

Simple breathing exercises, such as diaphragmatic breathing and the 4-7-8 technique, can promote relaxation and improve sleep. Instruct patients to practice for 5-15 minutes, one to three

times daily, in a comfortable and undisturbed position, either sitting or lying down.

*Diaphragmatic Breathing:*

- Place one hand on your chest and the other on your abdomen.
- Inhale slowly through your nose, allowing your abdomen to expand.
- Exhale slowly through your mouth, allowing your abdomen to contract.

*4-7-8 Breathing:*

- Inhale deeply through your nose for a count of 4 seconds.
- Hold your breath for a count of 7 seconds.
- Exhale slowly through your mouth for a count of 8 seconds.

## Supplements

After optimizing sleep through lifestyle changes, consider the following supplements to further assist with sleep difficulties. Since supplements are not FDA-regulated, it's advisable to choose products from companies with third-party testing or USP, NSF, or GMP certifications. Websites like consumerlab.com can also be used to verify supplement purity.

***Magnesium*** – Magnesium deficiency is prevalent, with an estimated 45% of Americans being magnesium deficient.[27] Magnesium is a critical mineral in the human body, affecting nearly 80% of known metabolic functions.[27] This deficiency is extensive due to the reduced nutrient content of foods, over-cooking, diseases, drugs, alcohol and caffeine consumption.[28]

Magnesium plays a role in over 300 metabolic reactions, involving hormone receptor binding, muscle contraction, neural activity, neurotransmitter release, vasomotor tone, and cardiac excitability. It is also involved with active transport of potassium and calcium across the cell membrane and is necessary for ATP function.[29]

Dietary sources include green leafy vegetables, fish, legumes and whole grains. Small studies have found that magnesium in the aspartate, citrate, lactate, and chloride forms is more bioavailable than magnesium oxide and magnesium sulfate.[30] Magnesium glycinate is also well absorbed and recommended for sleep. Experts recommend less than 350mg a day to reduce the risk of side effects;[31] usually, dosing is around 200mg to 600mg nightly.

In a systematic review and meta-analysis published in *BMC Complement Medical Therapy*, a pooled analysis of three randomized controlled trials regarding magnesium supplementation in older adults with insomnia, demonstrated a decreased sleep onset latency time and increased total sleep time (statistically insignificant); however, all of the trials included had moderate-high risks of bias and a low quality of evidence.[32] In a study published in *Sleep Medicine*, 80 individuals took 1 gram of magnesium L-threonate (MgT) daily for 3 weeks. Magnesium L-threonate improved sleep quality (including deep/REM sleep stages) along with improved mood, energy, alertness and daily activity and productivity.[33] In this study, MgT was determined to be safe and well-tolerated. In a study on rats comparing five forms of magnesium, magnesium oxide and magnesium citrate had the lowest bioavailability compared to the control group and magnesium acetyl taurate was the most rapidly absorbed and had the highest tissue concentration in the brain. Magnesium malate was also well absorbed.[34]

Generally well tolerated, common adverse events include flushing, hypotension, vasodilation, impaired reflexes, abdominal pain, diarrhea, flatulence, nausea/vomiting, respiratory depression, electrolyte disorders (hypocalcemia, hyperkalemia and hypermagnesemia). Serious adverse events include cardiovascular collapse, respiratory depression/paralysis, hypothermia, depressed cardiac function and pulmonary edema.[29] Magnesium supplements can interact or interfere with various medications, including bisphosphonates, antibiotics, diuretics, drugs treating acid reflux or gastric ulcers, and zinc supplements.[30]

***Valerian root***, a popular sleep aid with preparations commonly made from the herb's roots/stems, may work by increasing the amount of gamma aminobutyric acid available in the synaptic cleft.[35] It is available as teas, tinctures, capsules, or tablets.[35] For insomnia, doses range from 300-600mg or 2-3 grams of steeped root (in a cup of water for 10 to 15 minutes) to be consumed 30 minutes to 2 hours before bed.[36] There is some evidence that it can improve sleep quality and latency and is helpful for tapering off benzodiazepines.[36] In a systematic review and meta-analysis published in *Journal of Evidence Based Integrative Medicine*, valerian root may improve "quality of life [by promoting] sleep quality, thereby preventing a number of psychiatric and cognitive dysfunction."[37] This review also recommends whole herb over extracts for optimal efficacy. Mild side effects like headaches and dizziness are possible. Higher doses can cause morning sleepiness. Pregnant/nursing women and children under 3 should avoid it, and caution is advised with alcohol or sedative drugs, such as barbiturates and benzodiazepines due to potential additive sedative effects.[35]

***Chamomile*** *(Chamomilla recutita)* is an herb with historical medicinal use in various ancient civilizations, currently used for conditions like colds, anxiety, and insomnia.[38] It is recommended to aid sleep by interacting with benzodiazepine and GABA receptors, having high melatonin content, and exhibiting antidepressant and anxiolytic properties.[39] A meta-analysis showed chamomile improved sleep, particularly reducing awakenings, but did not lead to an improvement in the duration of sleep, percentage of sleep efficiency, or daytime functioning.[40] A RCT found chamomile extract at 200mg twice a day significantly improved sleep quality in elderly individuals.[39]

The National Center for Complementary and Integrative Health deems short-term oral use of chamomile likely safe. Uncommon side effects include nausea, dizziness, and allergic reactions, especially in those allergic to related plants. Chamomile may interact with birth control pills (decreasing their effect), estrogen-sensitive conditions such as breast or uterine cancer, liver-metabolized drugs, and warfarin. Caution is advised during pregnancy/breastfeeding. MSKCC highlights potential herb-drug interactions: increased anticoagulant/antiplatelet effects and increased sedative effects.

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Concurrent use with cyclosporine may elevate cyclosporine levels. Chamomile can also affect the concentration of drugs metabolized by CYP450 enzymes.

***L-theanine*** is an amino acid from the *Camellia sinensis* plant, which is commonly known for making green, black, white, or oolong teas. It promotes relaxation[41] and offers various health benefits such as antioxidant, anti-inflammatory, neuroprotective, anticancer, metabolic regulatory, cardiovascular protective, liver and kidney protective, immune regulatory, and anti-obesity effects.[42] Research suggests 200mg before bed may improve sleep quality through anxiolysis.[43] A meta-analysis of 18 studies showed that l-theanine significantly improved sleep onset, daytime function, and overall sleep quality.[44] Tea contains 25-60mg of l-theanine, and up to 250mg per serving is generally safe for most adults, with daily intake up to 500mg considered acceptable. Potential side effects include headache, dizziness, and nausea. It is contraindicated in pregnancy, lactation, and with sedatives.[45] It has had synergistic effects with midazolam[45] in animal models.

***Lemon balm*** *(Melissa officinalis)*, a member of the mint family, enhances GABA activity and inhibits its breakdown. It has been found to help manage sleep disturbances, anxiety, low mood, and overall quality of life.[46] One study showed 87% of participants reported improved sleep quality compared to 30% in the placebo group.[47] It can be taken as tea or capsules (300-500mg up to three times daily for capsules, or 1/4 to 1 tsp of dried herb in hot water up to four times daily for tea). Lemon balm is generally well-tolerated with few, if any, adverse effects similar to placebo, (non-specific effects were reported like headache, dizziness, and bloating).[48] Pregnant/breastfeeding women and those on sedatives, thyroid, or HIV medications should avoid it.[49]

## Conclusion

Sleep is unequivocally a critical pillar of health, impacting numerous physiological systems and overall well-being. Addressing sleep insufficiency, a recognized public health crisis, necessitates a comprehensive integrative medicine approach. While conventional pharmacological interventions may provide temporary relief, they often come with potential adverse effects and dependence. Instead, prioritizing lifestyle modifications, including meticulous sleep hygiene, regulation of the circadian rhythm through natural light exposure, and exploring non-pharmacological therapies like CBTI (cognitive restructuring and psychoeducation) and behavioral interventions (sleep restriction, stimulus control and relaxation techniques) offers a more sustainable path to optimizing sleep (see Figure 3 for a summary infographic). Additionally, judicious use of supplements such as magnesium, melatonin, l-theanine, and botanicals like valerian root, lemon balm, and chamomile, can complement these strategies. By recognizing and addressing the multifaceted nature of sleep, primary care physicians can empower patients to achieve optimal sleep, leading to enhanced overall health and reduced risks associated with sleep deprivation.

**Figure 3. Summary infographic for sleep management**

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# Integrative Pain Management in Breast and Gynecological Health

*By Samantha Williams, MD; Athena Vallejo, MD and Laura Krinsky, MD*

## Introduction

Chronic pain resulting from gynecologic and breast-related conditions remains a persistent and often debilitating problem impacting millions of people worldwide. Among these, endometriosis and breast cancer stand out for their profound impact on quality of life, mental health, and long-term wellbeing. While conventional treatments—such as hormonal therapy, surgery, chemotherapy, and radiation—are essential, many patients continue to experience lingering or inadequately managed pain. This has led to a growing interest in integrative health modalities, which combine evidence-based complementary therapies with conventional care to address pain more holistically.

Integrative medicine is particularly relevant in breast and gynecological health, as it acknowledges and addresses the multidimensional nature of pain impacting these sensitive areas of the body. Modalities such as acupuncture, mindfulness, pelvic physical therapy, and nutritional counseling offer promising adjuncts in both endometriosis and cancer care. These therapies have demonstrated benefit not only for pain but also for related symptoms such as anxiety, fatigue, and depression.

Family physicians are often the first point of contact for patients with undiagnosed or undertreated endometriosis, as well as for breast cancer survivors navigating persistent symptoms. While not the surgeons nor oncologists, family physicians who bring this integrative medicine approach can have a meaningful impact in the management of these patients' symptoms. Family physicians are uniquely positioned to incorporate integrative therapies into longitudinal care plans that address both physical and psychosocial needs. However, access to these therapies remains uneven, and disparities persist in the diagnosis and management of both conditions. In this article, we explore the role of integrative modalities in managing chronic pain associated with endometriosis and breast cancer, and we highlight the importance of equitable, culturally responsive implementation within primary care.

## Endometriosis and Integrative Modalities

*Acupuncture*

Clinical data support acupuncture as an effective adjunct for reducing pelvic pain in endometriosis. A multicenter randomized placebo-controlled trial protocol demonstrated significant reductions in pelvic pain among acupuncture recipients compared to controls, as measured by the Visual Analog Scale.[1] A systematic review further confirmed acupuncture's benefits, showing pain score reductions ranging from 20% to 40% and improvements in quality of life after 8–12 treatment sessions.[2] Proposed mechanisms include endogenous opioid modulation and decreased local inflammation, both relevant to the pathophysiology of endometriosis-related chronic pelvic pain.

*Pelvic Physical Therapy*

A randomized controlled trial involving women with deep infiltrating endometriosis found that a 12-week pelvic floor muscle physiotherapy program significantly improved urinary, bowel, and sexual function, as measured by validated questionnaires, and led to a 30% reduction in self-reported pelvic pain.[3] A review of multiple studies confirmed that manual therapy and biofeedback enhance pelvic floor muscle coordination and strength, correlating with decreased pain scores and improved functional outcomes.[4] These interventions help address pelvic muscle spasm and connective tissue restrictions that contribute to pain severity.

*Mindfulness and Psychological Support*

Though fewer high-quality trials exist, mindfulness-based stress reduction (MBSR) and cognitive behavioral therapy (CBT) have shown encouraging results in small cohorts. These approaches reduce pain catastrophizing and improve emotional well-being, with reported decreases of 25–40% in anxiety and depression scores.[5] By addressing psychological comorbidities, they enhance coping strategies and overall pain tolerance in individuals with endometriosis.

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*Nutrition and Anti-inflammatory Diet*

A prospective study examining dietary patterns found that diets rich in fruits, vegetables, and omega-3 fatty acids were associated with a 20% decreased risk of endometriosis diagnosis compared to those high in saturated fats and processed foods.[6] Although interventional studies remain limited, these findings suggest that anti-inflammatory nutritional counseling may modulate systemic inflammation, offering a promising adjunct in endometriosis care.

*Health Equity Considerations*

Endometriosis disproportionately affects patients of color, who often face longer diagnostic delays and reduced access to specialty or integrative care. Systemic barriers—such as implicit bias, socioeconomic challenges, inadequate access to anti-inflammatory foods, and cultural mistrust—contribute to these disparities.[7] Family physicians must take an active role in mitigating these gaps through culturally attuned screening, education, and advocacy for broader access to integrative services, many of which remain limited by cost and insurance coverage.

## Breast Cancer and Integrative Modalities

*Acupuncture*

Acupuncture has been extensively studied for its role in alleviating pain associated with breast cancer treatments. Organizations like the Society of Integrative Oncology now formally recommend acupuncture for aromatase inhibitor–associated joint pain. A randomized clinical trial found that women experiencing aromatase inhibitor–induced joint pain who received 12 weeks of true acupuncture reported significant pain reduction at 52 weeks compared to controls. True acupuncture was defined as having twelve 30-45 min sessions during 6 weeks followed by 1 session per week for 6 more weeks. Stainless steel, single-use, sterile, and disposable needles were used and inserted at traditional depths and angles. This was compared to minimally invasive, shallow needle insertion using thin and short needles at non acupuncture points and a control group which did not receive any acupuncture.[8] Additionally, a systematic review highlighted acupuncture's effectiveness in managing various treatment-related symptoms, including pain, fatigue, and anxiety among breast cancer survivors.[9]

*Mindfulness and Psychological Support*

Mindfulness-based interventions, particularly mindfulness-based cognitive therapy (MBCT), have shown promise in managing chronic pain in breast cancer survivors. A randomized clinical trial demonstrated that MBCT significantly reduced pain intensity and neuropathic symptoms in women treated for breast cancer.[10] Mindfulness-based stress reduction programs have also been associated with meaningful improvements in fatigue and quality of life, with effect sizes exceeding 0.50 across multiple domains.[11]

*Nutrition and Anti-inflammatory Diet*

Emerging evidence underscores the role of dietary patterns in managing chronic pain among breast cancer survivors. A systematic review highlighted that adherence to anti-inflammatory diets—particularly those rich in fruits, vegetables, whole grains, and omega-3 fatty acids—was associated with improved quality of life and reduced treatment-related symptoms, including pain and fatigue.[12] While direct intervention trials remain limited, these findings suggest that dietary modifications may serve as a valuable adjunct to conventional pain management strategies.

*Physical Therapy and Exercise*

Physical therapy interventions, including structured exercise and myofascial release, have demonstrated effectiveness in improving quality of life and reducing pain among breast cancer survivors, particularly those experiencing post-mastectomy pain syndrome (PMPS). A systematic review and meta-analysis found that exercise therapy significantly improved both overall quality of life and upper quadrant pain severity in women with PMPS, with consistent benefits across multiple trials.[13] Additionally, multimodal pelvic floor physical therapy (PFPT) has shown efficacy in gynecological cancer survivors with pelvic pain. A prospective study of a 12-week PFPT program—including manual therapy, biofeedback, and home exercises—reported significant improvements in pain intensity, pelvic floor dysfunction symptoms, and sexual function.[14] A one-year follow-up confirmed the sustained benefits of this intervention, with participants continuing to report reduced pain and improved quality of life.[15]

*Health Equity Considerations*

Breast cancer disproportionately affects Black women, who experience higher mortality rates compared to other racial and ethnic groups. Between 2011 and 2015, non-Hispanic Black women had a 41% higher breast cancer death rate compared to non-Hispanic white women, according to CDC data.[16] These disparities also extend to pain management, where Black and Hispanic breast cancer patients often face under-treatment and reduced access to integrative therapies.[17] Addressing these inequities requires culturally responsive care, which refers to the delivery of healthcare that is tailored to patients' cultural backgrounds, experiences, and social contexts. It involves self-awareness among providers, inclusive communication, and adapting care models to address social determinants of health and systemic inequities in access and outcomes. Additionally, expanded insurance coverage for integrative services and targeted research to understand and eliminate barriers for underserved populations, should be addressed.

## Future Directions

Integrative approaches to pain management in breast and gynecological health conditions like endometriosis and breast cancer are promising but require further investigation to refine their use and accessibility. Future studies should focus on:

- **Mechanistic insights:** Clarifying the biological pathways through which these interventions act.
- **Personalized medicine:** Identifying patient characteristics that predict positive responses to specific modalities.
- **Long-term efficacy:** Evaluating the sustained effects of integrative therapies over time.
- **Health equity:** Developing and implementing strategies that ensure equitable access to care across diverse populations.
- **Policy and coverage:** Advocating for insurance reform and policies that support integrative therapies as part of standard care.

By addressing these areas, healthcare providers can more effectively integrate these approaches into pain management strategies, improving patient outcomes and reducing disparities in breast-related and gynecologic conditions.

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# Impact on Lifestyle and Disease Management Through Culinary Medicine and Education on Grocery Store Tours

*By Melissa Sussman, DO, MPH and Mary Ellis, MD, FAAFP, ABOM*

## Introduction

Over 40% of American adults are considered obese.[1] Caused by a combination of factors, including genetics, environment, lifestyle, and other health conditions, obesity increases the risk of inflammation, diabetes, and cardiovascular conditions.[2-5] To prevent such outcomes, it is important for patients to control their modifiable risk factors such as diet and nutrition. As family medicine physicians, we have the unique opportunity to reach our patients through education and motivation in the clinic setting, providing tools for effective lifestyle change for their use outside of our clinics. Here we discuss the concept of culinary medicine, and our experience educating our patients outside of the clinic, through grocery store tours. These tours implement hands-on nutrition education for our diverse sociodemographic patient populations who are diagnosed with obesity. Our tours aim to aid health literacy, improve the nutrition, lifestyle, and confidence of our patient populations, as well as endeavor for lasting lifestyle modification and health impact.

## Health and Healthy Lifestyle is Multifactorial

As health practitioners, it is important for us to realize the multifactorial issues which contribute to the rise in obesity, such as genetics, socioeconomics, environment, culture, mental health and health literacy,[6,7] to name a few. When it comes to making what is considered healthy lifestyle choices, health literacy is key. Personal health literacy is defined as the degree to which individuals have the ability to find, understand, and use information and services to inform health-related decisions and actions for themselves and others.[8] Numerous studies demonstrate a correlation between low health literacy and poor health status. The lack of health literacy results in the underutilization of preventive resources, and such individuals may have trouble reading and understanding food labels, communicating symptoms to a clinician, measuring medications, navigating the health-care system, or following self-care instructions.[9] Food illiteracy also promotes health inequity, especially if it is combined with other factors such as poverty and/or a lack of access to fresh foods or nutrition education programs.[10] Food literacy is an important aspect of health literacy because it aids informed decision making about what individuals eat and how this impacts their health.[11]

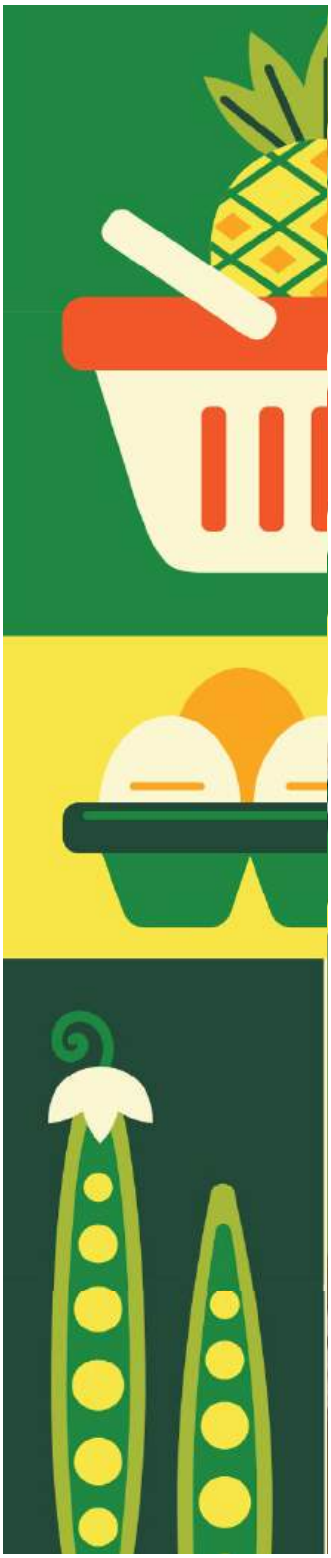
Increasing attention has been placed on the role of retail food environments in influencing dietary behavior and obesity risk. Studies have generally shown an association between living in a neighborhood with or in close proximity to certain types of food outlets and/or the availability of healthy food options and better dietary quality, higher fruit/vegetable intakes, and a lower risk of overweight, even after controlling for individual/family level characteristics.[12] Evolving changes in the global food supply over the last several decades have influenced retail food environments to be more "obesogenic," encouraging high supply and accessibility of ultra-processed foods that are generally rich in fat, sugar, or salt.[13,14]

Culinary medicine is an evidence-based field of medicine that combines nutrition science and culinary arts to create food that is delicious, promotes wellness, and prevents and treats disease.[15] It places emphasis on nutrition, and education on nutrition, an area in which many patients do not feel confident.[16] Grocery shopping tours is not a new concept. In fact, previous research indicates that consumers who participate in grocery store tours obtain improved nutrition knowledge,[17-19] and increased intention to purchase healthy foods,[17-19] improved attitudes towards healthy foods,[17] increased self-efficacy to purchase healthy foods[17] and adopted positive lifestyle modification changes. We utilize culinary medicine on our grocery store tours, bringing patients directly from our clinic to a supermarket and providing hands-on culinary medicine and nutrition training and education, including strategies for healthy food selection. These tours

aim to improve health choices, and health literacy with trickle down effects to informed lifestyle intention and modification. We aim to improve the confidence, motivation and empowerment of our patients, as they become armed with the tools and information to make informed nutritional choices. We then have the unique ability to follow up with our patients in the clinic setting.

## Nutritional Information Covered During the Tour

If one takes a look around a grocery store, it is easy to be overwhelmed. There are many aisles, sections, and nutritional topics to cover. Without overwhelming our patients during this educational experience, we provide nutritional information and helpful hints for cost effective and healthful nutritional choices.



A few areas:

*1. Shopping with a Plan*

First and foremost we like to emphasize the strategy of entering a supermarket on a full stomach or shortly after a meal, and with an agenda or plan, in an effort to mitigate impulsive choices.

*2. Observing Your Surroundings*

We encourage our participants to observe the shopping area, as often processed foods are either placed interior or on the perimeter of the supermarket. We encourage our tour participants to be mindful of their surroundings, stay on track, and to avoid areas of temptation. On our tour, participants should be able to identify where the processed foods are located, and are encouraged to avoid those areas unless it is part of their plan.

*3. The Dirty Dozen and the Clean 15*

Being able to identify organic foods in the supermarket is key to considering healthy food options. This is due to the increased utilization of pesticides in many fruits and vegetables. We educate that organic food is grown without using conventional pesticides or fertilizers made with synthetic ingredients, sewage sludge or bioengineering.[20] We cover identifying GMO stickers versus organic and conventionally grown products.

It's also important for our participants to know that organic foods come in many forms. They can be frozen, canned or fresh. We emphasize that making the healthiest choice *can* be cost effective and the importance for participants to be aware of such options without any stigma.

The "Dirty Dozen" is a list of 12 fruits and vegetables based on research that are most contaminated with pesticides, created by the Environmental Working Group. From most to least pesticides the list currently includes: strawberries, spinach, kale, collard and mustard greens, grapes, peaches, pears, nectarines, apples, bell and hot peppers, cherries, blueberries, and green beans.[21] The importance of understanding this list, is to weigh the options for which fruits/vegetables are most important to purchase organic, when considering health benefits and cost.

The "Clean 15" are items with the lowest amount of pesticide residue, according to research by Environmental Working Group's analysis of the most recent USDA data. Ranked from lowest to highest pesticides: avocados, sweet corn, pineapple, onions, papaya, sweet peas (frozen), asparagus, honeydew melon, kiwi, cabbage, watermelon, mushrooms, mango, sweet potato, and carrots. When considering which foods to purchase organic, this group contains the least amount of pesticides based on research and data.[21]

*4. Understanding Nutritional Goals*

We introduce the importance of fiber in the diet, in terms of reducing glycemic index, its role in lowering cholesterol, and feeling fuller longer.[22,23] Similarly we introduce the importance of protein for regulating hunger by reducing levels of ghrelin, potentially boosting metabolism,[24] increasing muscle mass,[25] potentially lowering blood pressure,[26] and for benefitting strength and improvements in bone health.[27] Though nutritional daily goals are continuing to be researched and re-established, on these tours we impart general nutritional goals: aim for ~25g of fiber per day,[28] <25g added sugar per day,[29] for meals to have <2300mg of sodium per day,[30] and daily fiber recommendations of 25g/day for women and 38g/day for men.[31] And protein recommendations 0.8 x kg body weight for those 18 and older.[32]

*5. Fish*

Walking through the aisle we discuss the differences between farm raised versus wild caught options (fresh, canned, and frozen) and ways to read the labels to ensure the quality advertised is accurate. We reference that wild salmon eat other organisms found in their natural environment, while often farmed salmon are given a processed, high fat, high protein diet which makes them larger.[33] While farmed salmon often contains more fat than wild salmon, a large portion of that fat comes from omega-6 fatty acids.[34] And antibiotics are often added to fish feed because farmed fish are most susceptible to infection.[35]

*6. Eggs*

We educate our participants on the definition and differences between free range versus cage free versus organic eggs. We discuss that cage-free eggs mean hens are not kept in cages but can still be housed indoors, in potentially crowded conditions. Free-range means that hens require outdoor access, may forage on wild plants and insects, but

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conditions within the barn can vary, and the duration of time outdoors is variable. Organic eggs are laid by hens raised on organic feed, must have access to the outdoors, and are not raised in cages.[36] Organic eggs are noted to have higher levels of omega-3 fatty acids, vitamin A and vitamin E.[37]

Other areas included in our tour and discussion include salt content and carcinogens in deli meat,[38] and looking for increased protein and fiber in grains like quinoa, wild rice, brown rice, and teff.[39]

*7. Making it Personal*

We wrap up our sessions by inviting our participants to tell us about meals they routinely make at home. Then we discuss how we might use the knowledge we learned on our tour to add and collaborate on their meals, giving us a better understanding of our participant's home practices, and welcoming them to try changes at home.

## Our Goals in Mind

There are many goals for these tours. We aim to improve health and food literacy for our participants through nutrition education. We aim for healthy eating to become more accessible and potentially enjoyable for our participants and to follow up with participants in our clinics, improving trust and strengthening health goals and experiences. We hope this use of culinary medicine can help overweight and obese patients manage their diet and lifestyle, and ultimately improve their health related conditions in the future.

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# Eastern Medicine for Managing Pain

*By Vince Caputo, DACM, MBA, LAc and Ani A. Bodoutchian, MD, MBA, FAAFP*

Chronic pain is pain that lasts for more than three months, or prolonged pain that continues past the expected time of healing. According to the Centers for Disease Control and Prevention (CDC), "Chronic pain affects nearly one in four U.S. (United States) adults, and that percentage has risen noticeably in recent years."[1]

"In 2021, about 20.9% of U.S. adults (51.6 million people) experienced chronic pain, according to a study from the U.S. Centers for Disease Control and Prevention."[2] It is one of the most common reasons that people seek medical care.

Of those who suffer from chronic pain, back pain is the number one complaint. Based upon research done by the Mayo Clinic in 2023, "Pain in the back or neck is the most common health reason that people miss work or schedule an appointment with a healthcare professional. For most people, back pain is a short-term annoyance, but for others, it can be a disabling, long-term condition."[3]

When chronic pain begins interfering with daily activities, it is usually the family doctor (or primary care physician) that patients turn to for relief. Initial treatment is started with nonsteroidal anti-inflammatory medication followed by muscle relaxants, corticosteroids, and then opioids.

Since the early 1990s, prescription opioids have been increasingly used as the primary treatment for chronic pain, including back pain. "However, the current opioid epidemic has complicated long-standing practices for chronic pain management, which historically involved prescribing pain medication."[4] In the United States alone, over 100,000 people died from drug overdoses in a recent 12-month period, with most deaths involving opioids (CDC).

Because of the opioid epidemic, managing this complex issue has become a challenge for many family doctors. As patients seek non-opioid solutions, the answer may be found in alternative medical therapies.

Eastern medicine, most notably acupuncture, has been recommended as a non-pharmacologic treatment for pain, specifically low back pain, by the North American Spine Society, the American College of Physicians, and the World Health Organization.

The following is a discussion of several non-pharmacological modalities for treating back pain.

## Manual Acupuncture and Electroacupuncture

Acupuncture is a prominent technique used in traditional Chinese medicine (TCM), which involves inserting thin needles into specific points on the body. Once stimulated, these acupuncture points harmonize the flow of qi (life energy) and blood, balance Yin and Yang to treat and prevent disease, and promote healing and well-being. Acupuncture has become one of the most recommended non-pharmacological treatments for back pain, more than doubling in popularity over the last decade.

The most implemented acupuncture methods for treating pain are either manual acupuncture or electroacupuncture. The difference between the two methods lies in how the acupuncture points are stimulated. Manual acupuncture, the more traditional form, involves the practitioner manually stimulating the point by twisting, flicking, or lifting the needle. Electroacupuncture, a more modern variation, stimulates acupuncture points by connecting a small device that sends electrical impulses between pairs of needles. Limited studies on the two methods have not shown a discernable difference in patient outcomes. The perceived advantage of electroacupuncture is that it provides a more

consistent form of stimulation over manual needle manipulation. In clinical practice, many practitioners use both methods to achieve optimal results.

Regardless of the form of acupuncture a practitioner chooses, the theory of how acupuncture works is similar. Acupuncture is believed to stimulate both the central and peripheral nervous systems, reduce inflammation, increase blood circulation, and promote healing.

In recent studies, functional MRI (fMRI) has shown that acupuncture activates the areas of the brain responsible for pain perception. Acupuncture stimulates the nervous system to treat chronic pain in several ways. Upon needle insertion, the nervous system will trigger the release of endorphins, the body's natural painkillers and mood enhancers. Acupuncture also promotes the release of specific neurotransmitters, such as dopamine, norepinephrine, and serotonin. Dopamine will modulate the pain sensation and how a person reacts to it; norepinephrine helps to block pain signals in the spinal cord; and serotonin assists in regulating the pain intensity signals that reach the brain. Acupuncture also treats pain by improving blood flow and microcirculation in the body. The increased blood flow will enhance the rate of tissue repair, therefore speeding up the rate at which the body heals. Acupuncture will also alleviate inflammation by reducing many pro-inflammatory molecules, such as cytokines.[5,6]

A 2017 systematic review, used by the Center for Medicare Services to determine the clinical utility of acupuncture for chronic low back pain, found that acupuncture resulted in greater pain relief and better function when compared with medications (non-steroidal anti-inflammatory drugs, muscle relaxants, or analgesics) immediately after the intervention.[7]

## Auricular Acupuncture

Auricular acupuncture (ear acupuncture) is a form of acupuncture that involves the insertion of acupuncture needles into specific points of the ear. The ear is considered a microsystem, which represents the entire body. Using the ear microsystem, a practitioner can treat a variety of issues, including pain. A 2024 study of auricular acupuncture for the treatment of pain stated, "In patients with chronic pain, multiple sessions of AA resulted not only in pain relief but also in improvements in function and disability." The 2024 study also found that ear acupuncture works in similar ways to traditional forms of acupuncture affirming, "Auricular acupuncture is thought to affect the body's autonomic nervous system and neuroendocrine system as it creates its source of pain relief for the body."[8]

Battlefield acupuncture (BFA) is a form of auricular acupuncture developed in military settings to provide fast, drug-free pain relief, even in combat zones. Today, this specialized type of auricular acupuncture is utilized in private clinics, emergency rooms, and VA hospitals. Battlefield acupuncture was created in 2001 by Dr. Richard Niemtzow, a U.S. Air Force physician. BFA involves placing very small, semi-permanent needles into five specific ear points, which remain in place for several days to provide a prolonged effect. The specific auricular points chosen are believed to be linked to the pain regulation centers of the brain.[9]

In August 2021, a group of researchers from the Department of Veterans Affairs concluded, "Given its effectiveness in providing immediate, short-term pain relief, from the perspective of both providers and patients, BFA is one potentially important tool in the toolkit to address patients' pain."[10]

## Cupping Therapy

Cupping therapy is a technique used to relieve pain, reduce inflammation, and promote healing by placing suction cups on the skin at strategic locations to stimulate blood circulation, relieve pain and muscle tightness, foster an anti-inflammatory response, and promote healing. The four methods of cupping most often used in clinical practice include static dry cupping, slide cupping, wet cupping, and fire cupping.

Static dry cupping, the most popular of the cupping methods, is when the cups are applied to the skin and left in place for five to 20 minutes without being moved. Slide cupping is a form of cupping in which the cups are applied to the skin and then gently glided across the surface of the body. Wet cupping involves puncturing the skin with a specialized needle before the application of the cup to draw out small amounts of blood from the area. Removing blood helps to detoxify the body, remove stagnation, and improve blood circulation. Fire cupping is used similarly to the previous three methods; the difference lies with how the suction is created. Instead of using air suction methods, the flame from an alcohol-soaked cotton ball is placed inside a glass cup, creating heat. As the cup is placed on the skin, the heat rapidly cools and creates the suction needed for application. Since there are several pros and cons for each, the cupping method chosen will be determined by the therapeutic goals of both the practitioner and the patient.

Cupping therapy has become popular recently due to the fanfare surrounding Olympic champion Michael Phelps' famous display of his cupping circles at swimming events. As cupping grows in popularity, additional studies are needed to investigate the long-term efficacy of cupping. A January 2024 study concluded, "Cupping demonstrated a superior and sustained effect on pain reduction compared with medication and usual care."[11]

## Gua Sha

Gua sha is a traditional Chinese medicine technique that involves scraping the skin with a flat tool, often made of jade, quartz, ceramic, stone, or metal. Gua sha is believed to stimulate the nervous system and activate the immune system. Accordingly, this therapeutic method helps the body to increase blood flow, relax muscle tension, reduce inflammation, alleviate pain, and promote healing.

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Today, gua sha is gaining attention for benefiting the skin, but it has been used in China for over 2,000 years to help treat chronic pain throughout the body. Calling for additional studies to confirm the results, a 2018 study on the therapeutic effects of gua sha for chronic low back pain determined, "Gua Sha appears to be an acceptable, safe, and effective treatment for patients with chronic low back pain."[12]

## Moxibustion

Another traditional Chinese medicine therapy, moxibustion, is often used to complement acupuncture. Moxibustion has been used for over 2000 years and is applied by burning processed mugwort to warm specific acupuncture points or areas of the body. This warming therapy can be applied directly to the skin or indirectly by holding it just above the skin. Moxibustion can increase blood circulation, reduce inflammation, improve immune function, and even correct breech presentation during pregnancy.

A study to assess the effectiveness of the combination of acupuncture and moxibustion, stated that "The reinforcing and circulation-promoting protocol of acupuncture and moxibustion is effective in treating refractory chronic low back pain mainly because low back pain can be significantly relieved and motor function can be promoted."[13]

## Myofascial Release

Myofascial release (MFR) is a specialized manual therapy technique that involves applying gentle, sustained pressure into the myofascial connective tissue restrictions or fascia adhesions, commonly known as trigger points or knots in the muscle, to eliminate pain and restore movement. To effectively release trigger points, pressure is applied slowly and held for several minutes. MFR therapy alleviates pain by improving blood circulation, reducing inflammation, and by stimulating the central nervous system to send signals to the brain to relieve muscle tension.

A 2021 systemic review analyzing the effects of MFR therapy for chronic low back pain indicated that "myofascial release may help improve the pain and physical function of patients with CLBP."[14]

## Kinesiotaping

Another alternative therapy that has attracted increasing attention in recent years is kinesiotaping. Invented by Japanese chiropractor Dr. Kenzo Kase in the 1970s, kinesiotaping is a therapeutic technique that involves applying elastic tape to the skin to alleviate pain by supporting muscles and joints, improving circulation, and facilitating lymphatic drainage. Supporters of kinseotaping claim that the alleviation of pain comes from the tape's ability to lift the skin from the underlying fascia and muscle, resulting in the creation of microscopic space that reduces pressure on the body's nociceptors.[15]

A 2018 study from Turkey stated that "Kinesio taping provided significant improvements in pain, ROM and disability at short term. These positive effects were sustained for ROM and disability at long term but not for pain."[16] Patients claim that the specialized tape offers support for the muscles in the lower back and lumbar region resulting in a reduction in pain levels. A 2019 systematic review affirmed that "Kinesio taping may be a new, simple and convenient choice for intervention in low back pain."[17]

## Conclusion

According to a study published by the Centers for Disease Control, "In 2023, 24.3% of adults had chronic pain, and 8.5% of adults had chronic pain that frequently limited life or work activities (referred to as high-impact chronic pain) in the past three months."[18]

In 2022, the CDC introduced a *Clinical Practice Guideline for Prescribing Opioids for Pain*, stating that the use of nonpharmacologic and nonopioid pharmacologic therapies should be maximized as appropriate because they do not carry the same risks as opioids. Accordingly, many health practitioners are turning to alternative treatments, such as Eastern medicine and acupuncture, to help their patients mitigate pain.[19]

As alternative medicine grows in popularity, patients today are looking for an integrative approach to address their health and well-being. Patients favor options in which they can use alternative medicine, like acupuncture, to supplement their Western medicine treatment plan. Rather than looking at it in terms of traditional versus alternative medicine, options such as acupuncture can become a facet of integrative medicine.

Integrating conventional medicine with alternative treatments can lead to improved patient outcomes, reduced side effects, and an overall increase in the patient's health and well-being.

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# Role of Integrative Medicine in Mental Health

*By Fatima Khan, MBBS*

At the end of a very busy panel, I entered upon my last patient for the day. The nursing staff reported they had a very high blood pressure despite multiple readings. The patient was a young person with no significant past medical history. It was our first meeting and their first physical in many years. During the conversation I asked if they were facing any stress. They said they just needed their asthma medication refill. I assured them that it would be taken care of and asked if they wanted to discuss anything else. They said they had a lot on their mind but it would need some time to even scratch the surface of what was troubling them. It was 5 minutes to 5pm and I said that we had the time.As the conversation progressed, I learned that they had been trying for 2 years to feel safe enough to be vulnerable and get help. After that visit, I closely followed up with the patient for months,ensuring they were established with all the mental health resources they needed. This is the story of one patient and it is by no means a unique experience.

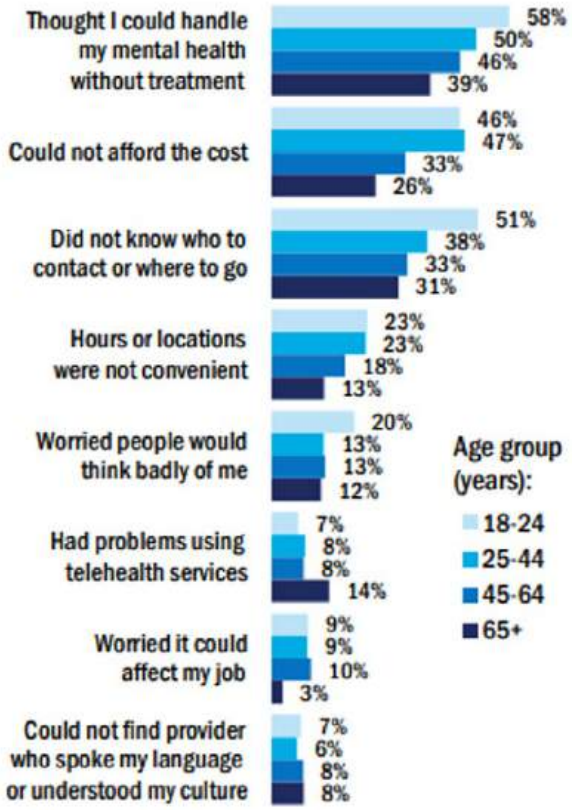
## Background

Three in ten New Yorkers are experiencing anxiety, depression or both, as per the latest data available from March 2023.[1] At any given time over half a million adult New Yorkers are estimated to have depression, yet less than 40% report receiving care for it.[2] In 2023, 14%, or about 945,000, of all adult New Yorkers reported an unmet need for mental health treatment in the past 12 months— not receiving as much treatment as they would have wanted, not receiving it as soon as they wish they had, or not easily accessing it at any point when they wanted it, which can be due to associated cost or stigma. See Figure 1.[65]

Many barriers to receiving mental health treatment disproportionately affect adults with low incomes and communities facing structural discrimination. This percentage was higher among NYC adults with severe psychological distress (SPD) as 46% of adults with SPD reported an unmet need for mental health treatment in the past 12 months. This makes it highly likely that a person accessing primary healthcare services may be experiencing symptoms of anxiety, depression or both.[3]

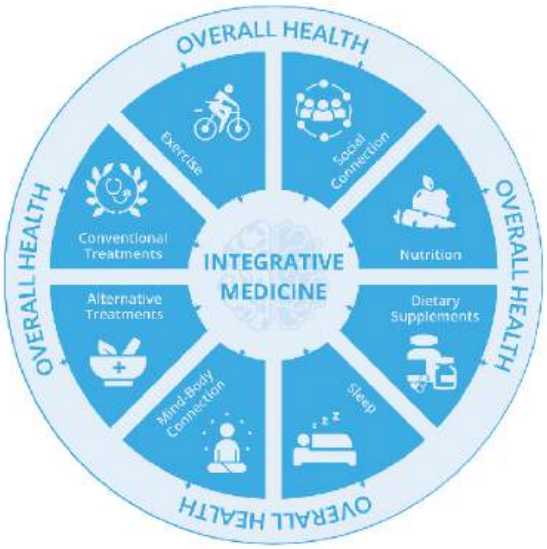
Stigma, long wait times for appointments or side effects of anxiolytics and anti- depressants may discourage people from engaging with psychiatry or psychotherapy to address their concerns.[3] This is the gap that evidence- based integrative medicine interventions can address adequately. These interventions are as varied as the patient populations we serve and cater to patients' individual needs and/or preferences. Different focal areas of integrative medicine are Featured in Figure 2.[66]

**Figure 1. Reasons for Unmet Need for Mental Health Treatment by Age Group among New York City Adults, 2023[65]**




More than one reason could be selected.
*Source: NYC Neighborhood Wellness Survey, 2023*

**Figure 2. Different Modalities of Integrative Medicine[66]**



| Table 1. Different Modalities of Integrative Medicine, their Description and their Uses | | |
|---|---|---|
| **Modality** | **Definition** | **Use** |
| ***Guided Imagery*** | Deliberate, directed daydreaming - a purposeful use of the imagination to support health and healing | Acute and chronic stress, anger management, anxiety, anxiety-based compulsive behaviors, depression, grief, phobias[4-10] |
| ***Progressive Muscle Relaxation*** | Contracting a muscle group for 10 seconds, noticing the tension in those muscles and then releasing the tension either starting with the hands and traveling towards the feet or vice versa bringing awareness to what the relaxed muscle feels like | Anxiety, depression, poor sleep quality, stress[11-15] |
| ***Biofeedback*** | Improve health by controlling bodily processes that happen involuntarily:<br>• Heart rate - heart rate variability (HRV)<br>• Muscle tension - Electromyography (EMG)<br>• Skin temperature - thermal biofeedback<br>• Neurofeedback or (EEG) electroencephalography | Anxiety, depression, insomnia[16-22] |
| ***Qigong*** (Chi Kung or Chi Gong) | Incorporates movement, breath, posture, and meditation to move energy in the body | Anxiety, cancer-related emotional disturbances, depression, fatigue, sleep disturbance[23-27] |
| ***Emotional Freedom Technique*** | Participant concentrates on an emotionally disturbing thought or memory while percussing seven or more acupuncture points | Anxiety, cravings, depression, PTSD, hypertension, psychological distress, quality of life[28-32] |
| ***Acupuncture*** | Inserting thin needles into specific acupoints in the body to stimulate the flow of qi (energy) and restore health | Depression, quality of life[33-34] |
| ***Ayurveda*** | Balancing the three different energy principles known as doshas (Vata, Pitta, Kapha) formed by the five elements (space, air, fire, water and earth) with treatment including but not limited to herbal medicines, dietary therapies, and yoga | Anxiety, depression, diminished sleep, gastrointestinal disturbances[35-38] |
| ***Repetitive Transcranial Magnetic Stimulation (rTMS)*** | Specific areas of the cerebral cortex are stimulated by repetitive magnetic pulses to excite or inhibit function in that region and also influence synaptic plasticity | Anxiety, depression[39-42] |
| ***Psychotherapy*** | Treating mental health issues by talking with a psychologist, psychiatrist or another mental health provider | Generalized anxiety disorder (GAD), depressive symptoms[43-45] |
| ***Nutrition*** | Changing one's diet to affect their overall health and well-being | Anxiety, depression, MDD, stress[46-55] |

Within integrative medicine there are numerous modalities of treatment. Specific treatments, their descriptions and uses are summarized in Table 1.

## Dietary Supplements – Tablets, Teas and More

In a cross-sectional study of patients with depression, 77% of CAM users were female, with a mean age of 41.5 years; 37.6% of depressed patients reported using integrative medicine modalities, and among these, 97.4% used herbal medicine, most commonly borage (77%), chamomile (46.9%), and lavender (21.2%). The main reasons for use were perceived effectiveness (62.8%) and dissatisfaction with conventional care. [110] Herbal medicine use for mental health is also associated with higher rates of comorbid chronic medical conditions and is often used alongside conventional psychiatric medications.[112]

In the United States, a large survey found that 43.8% of adults with neuropsychiatric symptoms (anxiety, depression, insomnia, etc.) used integrative medicine modalities including supplements, with prevalence increasing with the number of symptoms.[111]

In summary, integrative medicine users are predominantly female, middle-aged, and more likely to have a mental health diagnosis or symptoms, with prevalence rates differing depending on the population and region. The most common indications are depression, anxiety, and insomnia, and the most frequently used products are herbal medicines and dietary supplements.[110-112]

Dietary supplements are generally not FDA approved, but are regulated under the Dietary Supplement Health and Education Act (DSHEA) of 1994, 21 CFR Part 111 which sets forth requirements for their manufacture and labeling. Unlike pharmaceuticals,

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however, there is no pre-market approval required leading to the common misconception that dietary supplements are not regulated at all.[56]

Per 21CFR Part 111,[57] all supplements (and all marketing materials, websites and social media) must display a 'Supplement Facts' panel which includes:

- Key ingredients
- Other ingredients in order of predominance
- Net quantity of contents (e.g. 60 capsules)
- Disclaimer that the supplement is not intended for prevention or treatment of disease
- Directions for use
- Serving size
- Name and place of business of manufacturer, packer or distributor

For botanical supplements:

- Plant part used must be listed
- Extraction ratio and quantity of starting material (dry herb equivalent used in the product)
- If the herbal product is a standardized extract, the marker compounds must be named and their percentage concentration identified

A large national survey reported that 72% of people using herbal remedies were also taking prescription drugs and 84% were taking over-the-counter preparations.[58] A survey of multi-ethnic herbal medicine users, reported that 40% believed that combining herbs with drugs had a synergistic effect.[59] This could be a cause for concern when prescribing medicines because of possible herb-drug interactions.[60] See Figure 3 for a summary of studies of common supplements and their effects on enzymes that may lead to possible drug interactions.[61]

As the research base is growing, it is important for clinicians to understand their use and limitations in the treatment of anxiety.[62] Two review articles on plant-based medicines for anxiety disorders provide a good overview of preclinical studies[63] and clinical studies[64] involving 53 separate plants. Of these plants, 21 had human clinical trial evidence. See Table 2 for common dietary supplements and their uses.

## Discussion

There has been a notable rise in the proportion of U.S. adults using complementary health approaches.[109] Though the influence of integrative medicine and use of complementary and alternative medicine modalities are seeing an exponential increase, research in many modalities remains limited or unreliable due to lack of reliable study design. Moreover, the frequency of utilization of integrative medicine modalities is often not truly reflected, as patients generally do not mention their use during a clinical encounter. The HOPE (Healing Oriented Practices & Environments) note is an excellent tool that can be used as part of high value visits or establishment of care visits to document all herbs, botanicals and dietary supplements being taken by a patient. The HOPE note template can be accessed at drwaynejonas.com/HOPE.

## Conclusion

Patients make better decisions when they feel empowered. They are being exposed to numerous integrative medicine modalities, often from individuals who may not be appropriately certified or may share partially incorrect information which can cause more harm than good. As family medicine physicians, becoming well versed in discussing evidence- based integrative medicine resources can be invaluable. By including integrative medicine approaches in the healthcare plan for our patients, mindful of their acute or chronic comorbidities and prescription medicines, family medicine physicians can facilitate a 20-minute visit that can be life changing for patients.

**Table 2 – Common Dietary Supplements and their Uses**

| Dietary Supplement | Use |
|---|---|
| ***Inositol*** | Anxiety, depression, insulin resistance, panic disorder, polycystic ovarian syndrome(PCOS)[67-75] |
| ***Kava root or rhizome*** | Generalized anxiety disorder (GAD), agoraphobia without panic disorder, social phobia, specific phobia, adjustment anxiety disorder[76-77] |
| ***Ashwagandha*** | Generalized anxiety, stress[78] |
| ***Bacopa leaf (Bacopa monnieri)*** in combination with ***gotu kola (Centella asiatica)*** | Anxiety[79-81] |
| ***Cannabidiol (CBD )*** | Anxiety[82] |
| ***Melissa officinalis (lemon balm)*** | Anxiety, depression, stress, sleep, quality of life[83] |
| ***Rhodiola (Rhodiola rosea)*** | Fatigue, mild to moderate depression, generalized anxiety[84-86] |
| ***Valerian (Valeriana officinalis)*** | Insomnia, anxiety, depression[87-92] |
| ***Omega-3 fatty acids*** | Unipolar depression[93] |
| ***Vitamins B1, B2, B6, B9, B12*** | Depression[94-95] |
| ***Iron*** | Mental health, quality of life[96-97] |
| ***Zinc*** | Depression[98-100] |
| ***S-adenosyl-methionine (SAMe)*** | Depression[101-106] |
| ***Vitamin D*** | Depression[107] |
| ***Saffron*** | Depression[108] |

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**Figure 3. Summary of the Laboratory, Animal, and Human Studies summarizing common supplements and their effects on enzymes that may lead to possible drug interactions[61]**

Table 1. Summary of the Laboratory, Animal, and Human Studies

| | Laboratory | | | Animal | | | Human | | |
|---|---|---|---|---|---|---|---|---|---|
| Botanical | Inhibit | Induce | No Effect | Inhibit | Induce | No Effect | Inhibit | Induce | No Effect |
| Black cohosh | | | | | | | CYP2D6 | | CYP1A2<br>CYP2EI<br>CYP3A4<br>CYP3A5<br>Pgp |
| Echinacea' | CYP1A2<br>CYP2C9<br>CYP2D6<br>CYP2E1<br>CYP3A4<br>Pgp<br>OATP | CYP3A4 | CYP2D6 | | | | CYP1A2<br>CYP2C9<br>CYP3A4 | CYP3A4 | CYP2D6<br>Pgp |
| Garlic | CYP2C9<br>CYP2C19<br>CYP3A4<br>Pgp | Pgp | CYP1A2<br>CYP2B6<br>CYP2C9<br>CYP2C19<br>CYP2D6<br>CYP3A4<br>Pgp | CYP2A<br>CYP2E | CYP1A<br>CYP2B<br>CYP3A<br>GST | | CYP2E1<br>CYP3A4 | | CYP1A2<br>CYP2D6<br>CYP3A4 |
| Gingko biloba | CYP1A2<br>CYP2C8<br>CYP2C9<br>CYP2C19<br>CYP2E1<br>CYP3A4<br>Pgp | Pgp | CYP3A4<br>CYP2D6 | CYP3A | CYP1A<br>CYP2B<br>CYP2C<br>CYP2E<br>CYP3A<br>GST | | | CYP2C9<br>CYP3A4 | CYP1A2<br>CYP2D6<br>CYP2E1<br>CYP3A4<br>Pgp |
| Green tea | CYP1A<br>CYP2C9<br>CYP3A4 | CYP1A<br>UGT1A | | | CYP1A<br>CYP2E<br>UGT | CYP1A<br>CYP2D<br>CYP3A4 | CYP3A4 | | CYP1A2<br>CYP2C9<br>CYP2D6<br>CYP3A4 |
| Kava | CYP1A2<br>CYP2C9<br>CYP2C19<br>CYP2D6<br>CYP3A4<br>Pgp | CYP3A4 | CYP2A6<br>CYP2C8<br>CYP2E1<br>Pgp | CYP2C11<br>CYP2D | CYP1A<br>CYP2D<br>CYP2E<br>CYP3A | CYP1A2<br>CYP2B1<br>CYP2C6<br>CYP2C11<br>CYP2E1 | CYP1A2<br>CYP2E1 | | CYP1A2<br>CYP2C19<br>CYP2D6<br>CYP3A4<br>Pgp |
| Milk thistle | CYP2C8<br>CYP2D6<br>CYP2E1<br>CYP3A4<br>UGT1A<br>UGT2B | | Pgp | | | | | | CYP1A2<br>CYP2D6<br>CYP2E1<br>CYP3A4<br>UGT<br>Pgp |
| St John's wort | CYP1A2<br>CYP1A1<br>CYP1B1<br>CYP2C9<br>CYP2D6<br>CYP3A4 | | | Pgp<br>MRP | CYP2E1<br>CYP3A4<br>Pgp<br>MRP | UGT | | CYP3A4<br>Pgp | CYP2D6<br>CYP3A4 |

**Abbreviations:** CYP, cytochrome P450; GST, glutathione S transferase; MRP, multidrug resistance protein; OATP, organic anion transporting peptide; Pgp, P-glycoprotein; UGT, uridine diphosphate glucuronosyltransferase.


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# Beyond the Multivitamin: Embracing an Integrative Medicine Approach to Nutrition in Primary Care

*By Jack Scheutzow, MD and Sandy Wang, MD, MPH*

## Background

Despite its critical role in preventing and managing chronic disease, nutrition is still underemphasized in most traditional medical education programs. In the United States, nearly 71% of medical schools fall short of the recommended minimum of 25 hours of nutrition education. About 36% offer less than half that amount, and nutrition is rarely integrated into clinical training.[3] This gap is further widened by barriers such as limited curriculum time, a lack of faculty with nutrition expertise, and inadequate focus on practical counseling skills.[4] As a result, physicians may feel unprepared to provide dietary guidance, limiting their effectiveness in addressing nutrition-related health issues.[4]

This issue is particularly concerning in primary care, where patients often arrive with conflicting information about nutrition. Media platforms frequently promote marketing-driven solutions such as supplements, detoxes, and restrictive diets. For instance, a recent content analysis of TikTok videos revealed that weight-loss, muscle-building, and cleanse/detox supplements are heavily promoted, with approximately 97% of these videos making unsubstantiated health claims and rarely citing scientific evidence or professional credentials.[5] Exposure to such contradictory nutrition information, especially through news and social media, contributes to confusion and skepticism about dietary recommendations, ultimately decreasing patients' motivation to follow evidence-based guidance.[6] This confusion is further compounded when physicians are unable to offer clear, evidence-based advice due to gaps in their own nutrition training.

A clear example of this challenge is the widespread use of multivitamin-mineral (MVM) supplements. In the US. About 30% of adults and 25% of adolescents report taking MVMs daily.[7] This popularity is largely driven by the belief that supplements offer an easy way to "fill nutritional gaps" or help prevent disease.[8] However, large randomized controlled trials have found little evidence to support these claims for the general population. For instance, the Physicians' Health Study II (PHS II) showed no reduction in cardiovascular events or overall mortality, while the Cocoa Supplement and Multivitamin Outcomes Study (COSMOS) found no significant effect on total cancer incidence or cardiovascular disease.[9,10] Reflecting these findings, major health organizations such as the U.S. Preventive Services Task Force (USPSTF), the American Heart Association, and the American Institute for Cancer Research either do not recommend MVMs or conclude that there is insufficient evidence to support their use for chronic disease prevention.[11-13] Nevertheless, many patients continue to rely on supplements over sustainable dietary changes.

## Focusing on Nutrition and Lifestyle Medicine Approach

Nutrition is a cornerstone of health and a key component of lifestyle medicine. Poor dietary habits are among the most significant modifiable risk factors for chronic diseases worldwide. They are estimated to contribute to 11 million deaths each year, primarily from cardiovascular disease, stroke, and diabetes.[1]

Major dietary risk factors include high sodium intake and low consumption of fruits, vegetables, whole grains, and nuts. The Global Burden of Disease Study has identified these factors as leading contributors to both mortality and disability-adjusted life years (DALYs) worldwide. Extensive research from both epidemiological and clinical studies shows that diets rich in plant-based foods, such as the Mediterranean and Dietary Approaches to Stop Hypertension (DASH) diets, are strongly linked to lower risks of all-cause mortality, cardiovascular disease, and cancer. Notably, improving diet quality over time has been associated with an 8–22% reduction in overall mortality and up to a 28% decrease in deaths from cardiovascular disease.[2]

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Fortunately, family physicians are uniquely positioned to reframe the conversation around nutrition. Rather than focusing on supplements and quick fixes, providers can guide patients toward a whole-food, plant-predominant diet, which has been consistently associated with lower risks of chronic disease and improved quality of life.[14] Importantly, physicians do not need to be nutrition experts to incorporate meaningful dietary guidance into routine care. A range of evidence-based, time-efficient, and accessible resources now exists to help clinicians confidently integrate nutrition into their practice. We present some evidence based resources with examples on how clinicians can implement these into their daily practice more confidently.

## Steps on Starting Nutrition Counseling in the Clinical Setting

It is important to address nutritional deficiencies and habits that detract from a patient's goals initially so as to make "room" for new foods, ideas, and relationships with a new diet. Mindfulness drives much of healthy eating and without addressing the above, it is difficult to adhere to new habits. Patients often resort to quick fixes and multivitamins as changing poor habits requires more resistance and work. When patients ask their physician about "going on a diet," they must realize that this process involves both behavioral mindfulness as well as addressing nutrition; behavior changes take time and a patient must be ready to work through these changes. When a physician first addresses diet with a patient, it is important to set the expectation that changing eating habits and being more "healthy" is a lifestyle and not just following a set of guidelines.

### 1. REAPS v2 Scoring

The first step for a clinician to address nutrition in the clinical setting is through the REAPS v2 (Rapid Eating Assessment for Participants) scoring, which is a validated screening tool that comprises five sections which assess the frequency of key food group consumption and behaviors. This can be completed within 5 minutes and can be incorporated during annual physicals or even during visits for chronic illness follow up visits for diabetic and cardiac health.[16,17] The simple structure helps clinicians quickly identify habits like low fruit and vegetable intake, high processed food consumption, or frequent sugary beverage use. The American Heart Association recognizes REAP-S for its validity, brevity, and alignment with current dietary guidelines,[18] making it an efficient tool for integrating nutrition assessment into routine care. (Figure 1). It also assesses a patient's readiness to make changes in their diet.

### 2. Focusing on "C foods"

Once a clinician has taken a broad history of nutrition, they can take a more targeted approach in addressing eating behaviors that could be preventing a patient from achieving their optimal nutrition goal. In integrative medicine, "C foods" (chips/cookies/crackers/colas/etc.) are often foods high in refined grains or sugar content. Many patients are not aware of the amount of these foods they are consuming using "some" and "not a lot" as vague answers. Just as clinicians quantify alcohol consumption with "shot, handle, pint, etc." it is important to quantify how many cookies, for example, a patient is actually consuming to bring mindfulness into the clinical visit.

Example:

- Ask a patient: How many chips/cookies/crackers/colas/etc. do you consume a day? Then set a goal to help patients decrease intake that is gradual. Eliminating immediately tends to make patients more likely to binge when they are stressed.
- If a patient is consuming 6 cookies a day, talk about cutting down to 5.
- Work with patients on ways to decrease access to "C foods" such as buying less packages at the store, ways of making it harder to access in the home (store in hard to reach areas), etc.

### 3. Mindfulness Eating

Mindfulness eating works on training patients to have a more healthy and mindful relationship with food whereas mindless eating involves eating "automatically" or eating when we aren't really hungry but there is food in front of us. Examples of other mindless eating habits include not paying attention to the food while multitasking, eating when stressed so our minds are not actually on the food but on stressors, or eating as a comfort option for coping with stress as it can be a quick fix. Unfortunately, patients then often struggle with knowing which is physiological vs. psychological hunger. When asked in a clinic what patients are eating at home to cause weight gain, this is when they sometimes frustratedly say: "I'm not eating anything! I don't know why I'm gaining weight!." It is likely patients are not aware of how much they are actually eating when they are mindlessly eating.

Examples:

1. Gently ask patients if they tend to snack or eat when doing multiple tasks, trying to relax, or eat in front of work/computer monitors. Bring awareness to the experience of eating, rather than approaching meals or snacks mindlessly or automatically.
2. Help patients learn to distinguish between physical and psychological hunger by telling the patient to pause right before they take a bite or open a bag of chips and consider: "Am I actually hungry or just eating out of habit?"
3. Help patients learn to savor each bite of food – and stop when their taste buds get "tired."
   - Ask a patient: does the 6th cookie actually taste as good as that 5th cookie?
4. Help patients learn to stop before becoming overly full- 75% vs. 100% full.
   - Ask a patient when their plate or portion is half gone to pause and think, can I save this for later because I'm getting full or am I actually hungry and need to finish this?
5. Help patients choose foods both for personal satisfaction and for nutritional value.

- Ask a patient to reflect on the snack in front of them:
  - Am I getting a bang for my buck nutritionally? Or is this considered "empty calories?"
  - Am I going to actually feel good later eating this, or will I regret this decision?

6. Make eating a social event-
   - Discuss eating with family/friends, or even eating at a table without any screens or work.
7. Talk about mindfulness- Be aware of stress eating and mindless snacking.
   - Ask a patient, do you have a comfort food you tend to consume when you're stressed? For some people, childhood favorites that were provided as rewards or when upset can be problematic.

### 4. Starting A "Diet"

Most clinicians may feel they are not qualified to give nutritional education, but in truth, we know all evidence-based healthy diets focus on a few central tenets. We know that diets such as DASH, Mediterranean, Blue Zone, and plant-predominant eating patterns are strongly associated with improvements in blood pressure, cholesterol levels, inflammation, glycemic control, and overall cardiometabolic health. For example, the DASH diet has been shown in randomized controlled trials to lower systolic blood pressure by 5–6 mm Hg and diastolic pressure by about 3 mm Hg, with added benefits for LDL cholesterol, insulin sensitivity, and weight management.[21] National guidelines from the American Heart Association and American Diabetes Association increasingly emphasize dietary patterns that focus on the following:

1. Minimally processed, nutrient-dense foods while limiting added sugars, sodium, saturated fats, and highly processed items[19,20]
   - Remind patients that if ingredients are difficult to pronounce or there are >5 ingredients, it is likely very processed.
2. Eating whole grains, whole produce, and limited animal protein
3. Eating a wide variety of colors and textures

These guidelines offer a structured, evidence-based framework for dietary counseling, helping clinicians set clear and achievable goals. When combined with behavioral strategies like motivational interviewing and SMARTIE goal-setting (Specific, Measurable, Achievable, Relevant, Time-bound, Inclusive, Equitable), they can improve patient engagement, promote gradual dietary changes, and support lasting health improvements.

If clinicians are still needing more training, the American College of Lifestyle Medicine's *Food as Medicine* has online free, self-pacing CME modules that cover the science behind whole-food, plant-predominant diets and their role in preventing chronic diseases like heart disease, type 2 diabetes, and cancer. The curriculum emphasizes reducing added sugars, saturated fats, and processed foods, while also teaching practical communication strategies such as motivational interviewing and brief dietary assessments.[15]

### 5. Addressing Barriers and Relapse

It is important that clinicians treat dietary changes similarly to smoking cessation in that there will be relapses and barriers in a patient's dietary journey. Gently let a patient know it is acceptable to have bad days and relapse. It is more important that they are aware of the trigger that caused the relapse and should write it down to create both mindfulness and to build trust with a physician. Below are barriers commonly encountered by patients as they make dietary changes.

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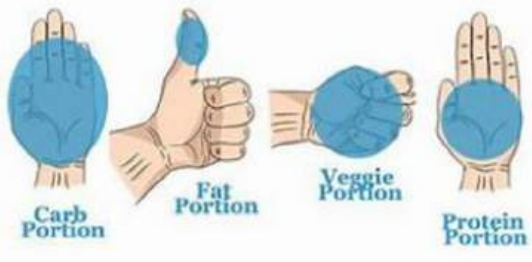
| Barrier | Tools/Ideas |
|---|---|
| **I don't have time and it takes too much work** | 1. If a patient is financially able, outsource meals to a friend who cooks healthier and is willing to make extra portions<br>2. Get a subscription to healthy meal plans<br>3. Create a schedule with a patient to help find the best time for healthy meal preparation<br>4. Enlist help from family members to help purchase, and prep ingredients<br>5. Discuss current meal prep and see how to substitute ingredients to save time |
| **I don't know how to start** | 1. Have patient choose one main change- more whole grains instead of white rice, more vegetables, etc., rather than changing their entire diet<br>2. Watch and research recipes in free apps, YouTube videos, or online blogs<br>3. Walk around the produce section and see what "speaks to them"<br>4. Choose a favorite "produce" and focus on this weekly |
| **It's expensive to eat healthy** | 1. Have patient bring itemized receipts from their current spending on processed foods and compare to actual prices of produce<br>2. Encourage frozen veggies, dried beans and grains<br>3. Buy store brands and sales<br>4. Buy in bulk<br>5. Eat "in season" |
| **Portion control** | Eat calories rather than drink them. A patient will get full faster from eating a fruit salad rather than from drinking that salad blended as a smoothie. Chewing turns on satiation signals that drinking does not.<br><br>The hand rule in general is a good way for patients to portion control quickly without feeling intimidated by "measurements" such as cups, ounces or grams.<br><br>  |

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**Figure 1: REAP-S v.2 (Rapid Eating Assessment for Participants, Shortened Version, v.2)**
Source: Shankar V, Thompson KH, Wylie-Rosett J, Segal-Isaacson CJ. Validation and reliability for the updated REAP-S dietary screener, (Rapid Eating Assessment of Participants, Short Version, v.2). *BMC Nutr.* 2023;9(1):88.

| **In an average week, how often do you:** | | | | |
|---|---|---|---|---|
| 1. Not feel well enough to shop or cook? | Every day (0) | More than 2 times a week (1) | 2 or fewer times a week (2) | Never (3) |
| 2. Eat fewer than 2 meals per day? | Every day (0) | More than 2 times a week (1) | 2 or fewer times a week (2) | Never (3) |
| 3. Eat less than 3 oz per day (see sizes below) of high-protein foods such as poultry, meat, fish, or tofu: 1 oz of nuts; or 1½ cups of beans?<br>3 oz meat, chicken, or fish ls the size of a deck of cards or ONE of the following: 1 regular ham- burger. 1 chicken thigh or leg. 1 medium tilet of fish, a small porkchop, or a small handful of nuts. | Every day (0) | More than 2 times a week (1) | 2 or fewer times a week (2) | Never (3) |
| 4. Consume less than 2 servings of a calcium-rich food such as milk, yogurt, cheese, or calcium- fortified soy, rice, or almond milk?<br>**1 Serving =** 1 cup milk or yogurt; 2 oz cheese. | Every day (0) | More than 2 times a week (1) | 2 or fewer times a week (2) | Never (3) |
| 5. Eat 3 or more servings of vegetables per day? (Do not include potatoes and corn as vegetables.)<br>**1 Serving =** ½ cup cooked vegetables or 1 cup leafy raw vegetables.<br>*½ cup is the size of a lightbulb and 1 cup is the size of a baseball.* | Every day (3) | More than 3 times a week (2) | 3 or fewer times a week (1) | Never (0) |
| 6. Eat 2 or more servings of fruit per day?<br>*(Do not include fruitjuice or fruit drinks.)*<br>**1 Serving =** ½ cup or 1 medium fruit<br>*½ cup is the size of a lightbulb.* | Every day (3) | More than 3 times a week (2) | 3 or fewer times a week (1) | Never (0) |
| 7. Eat 2 or more servings of whole grain products or high-fiber starches a day?<br>**1 Serving =** 1 slice 100% whole grain bread or crackers; 1 cup whole grain cereal like Shredded Wheat, Wheaties. or oatmeal; ½ cup brown rice, whole wheat pasta, boiled or baked potatoes, yucca, yams, or plantain.<br>*½ cup is the size of a lightbulb.* | Every day (3) | More than 3 times a week (2) | 3 or fewer times a week (1) | Never (0) |
| 8. Eat fish, shellfish, or other seafood? | Every day (3) | More than 3 times a week (2) | 3 or fewer times a week (1) | Never (0) |
| 9. Eat beans, peas, lentils, or other legumes? | Every day (3) | More than 3 times a week (2) | 3 or fewer times a week (1) | Never (0) |
| 10. Eat tree nuts, peanuts, or nut butters? | Every day (3) | More than 3 times a week (2) | 3 or fewer times a week (1) | Never (0) |
| 11. Use olive oil, peanut oil. or other vegetable oils? | Every day (3) | More than 3 times a week (2) | 3 or fewer times a week (1) | Never (0) |
| 12. Eat high-fat meats such as hamburger, ribs, steak. lamb chops, chicken or turkey wings, hot dogs, or cold cuts such as bologna and salami? | Every day (0) | More than 3 times a week (1) | 3 or fewer times a week (2) | Never (3) |
| 13. Eat more than 1 tablespoon of cooking or table fats that are solid at room temperature, such as butter, stick margarine. bacon fat. or vegetable shortening (like Crisco)?<br>*1 tablespoon is the size of a poker chip* | Every day (0) | More than 3 times a week (1) | 3 or fewer times a week (2) | Never (3) |

| | | | | |
|---|---|---|---|---|
| 14. Drink 12 oz or more of non-diet soda, fruit drink/punch, fruit juice, or Kool-Aid per day<br>*1 can of soda - 12 oz* | Every day (0) | More than 3 times a week (1) | 3 or fewer times a week (2) | Never (3) |
| 15. Eat sweets like cake, cookies. pastries. donuts. toaster pastries, muffins, chocolate, and candies? | Every day (0) | More than 3 times a week (1) | 3 or fewer times a week (2) | Never (3) |
| 16. Eat packaged snack foods such as chips, salted pretzels. or pizza bites? | Every day (0) | More than 3 times a week (1) | 3 or fewer times a week (2) | Never (3) |
| 17. Eat meals from restaurants. take-out places. convenience stores, or entertainment venues? | Every day (0) | More than 3 times a week (1) | 3 or fewer times a week (2) | Never (3) |
| 18. Prepare meals at home from basic ingredients such as fresh or frozen vegetables, uncooked pout- try, pasta, or beans? | Every day (3) | More than 3 times a week (2) | 3 or fewer times a week (1) | Never (0) |
| 19. Have more than 1 alcoholic drink per day (women) or 2 alcoholic drinks per day (men)?<br>**1 Drink -** 5 fluid oz of wine; 12 fluid oz of beer; 1½ oz of hard liquor such as vodka, whiskey, gin. | Every day (0) | More than 3 times a week (1) | 3 or fewer times a week (2) | Never (3) |
| 20. Walk for at least 1 mile (about 2,000 steps) or exercise for at least 15 minutes? | Every day (3) | More than 3 times a week (2) | 3 or fewer times a week (1) | Never (0) |
| 21. How interested are you in making changes to your eating or physical activity habits to be healthier? | Very interested | Interested | Disinterested | Very disinterested |

SCORING: The highest possible score for REAP-S v.2 is 60 points. Although higher numbers generally represent healthier habits, a given person might be high in one subcale and low in another. Therefore, we encourage clinicians to focus on subscale scores and perhaps individual scale items rather than a total score for the REAP-S v.2 screener. We also recommend clinicians provide patient education for those specific areas where the person has low or lower scores (and possibly praise the patient for good habits too!).

| | | Action | |
|---|---|---|---|
| **Section** | **Patient's score** | **Investigate/discuss** | **Encourage/commend** |
| Food sufficiency/food insufficiency | _____ | 8 or lower | Greater than 8 |
| Healthy eating pattern | _____ | 14 or lower | Greater than 14 |
| Low nutrient density foods | _____ | 16 or lower | Greater than 16 |
| Exercise | _____ | 1 or lower | Greater than 1 |
| Readiness to change | _____ | Disinterested/very disinterested | Very interested/interested |

## Conclusion

As part of a whole-person, integrative approach to care, family physicians are uniquely positioned to cut through nutrition misinformation and guide patients toward sustainable, evidence-based dietary habits. By using accessible tools like REAPS v.2, addressing common barriers and behaviors such as "C foods" and mindless eating, and framing nutrition as a lifestyle rather than a quick fix, family physicians can make a meaningful impact. In doing so, they not only empower patients to take ownership of their health but also reaffirm the role of primary care in addressing the root causes of chronic disease through practical, preventive strategies.

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# Osteopathic Manipulation for the Hospice and Palliative Care Patient

*By Aaron Choy, DO*

## Overview

Family physicians are often at the forefront of providing hospice and palliative care, in which managing complex symptom burdens and enhancing quality of life are central goals. Patients receiving hospice and palliative care are often prescribed multiple pharmacologic agents aimed at symptom relief. However, this can pose challenges, including adverse drug interactions and medication intolerance; in addition to this, patients may have a preference to minimize pharmacologic interventions. Osteopathic manipulative treatment (OMT) is a hands-on manual technique practiced by doctors of osteopathic medicine (DO) involving manipulation of the human body to help diagnose, treat and/or prevent illness in a holistic manner. OMT offers a non-pharmacologic and personal approach to managing symptoms such as pain, dyspnea, constipation, anxiety and lymphedema. Although OMT has been studied in relation to postoperative recovery and specific symptom relief (e.g., back pain, dyspnea), its potential use in hospice and palliative care remains largely undocumented and understudied in American medical literature.

The integration of OMT into palliative care paradigms may offer a compassionate, patient-centered adjunct to traditional symptom management, without adding to medication burden. Moreover, OMT may address not only the somatic dimensions of pain but also its emotional, social and spiritual components. This perspective advocates for a more comprehensive, holistic approach to hospice and palliative care within the scope of family medicine.

## What is Palliative Care?

Palliative care is a specialized approach to medical care for individuals living with serious, often progressive illnesses such as end-stage renal disease, advanced cancer, heart failure, and dementia. Its primary focus is on relieving symptoms, managing distress, and enhancing quality of life—regardless of the stage of illness or the need for curative treatment.[1] Hospice care represents the most intensive form of palliative care and is intended for patients with a life expectancy of six months or less, as determined by clinical judgment. At this stage, the emphasis shifts entirely to comfort-focused care, prioritizing symptom control, emotional support, and dignity at the end of life. Hospice and palliative medicine is a relatively new medical discipline, officially recognized as a distinct specialty by the World Health Organization (WHO) in 1990 and as a subspecialty by the Accreditation Council for Graduate Medical Education (ACGME) in 2006.[2] As a result, family physicians are often at the forefront of this care, given their long-standing relationships with patients and their ability to address complex medical and psychosocial needs over time.

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An essential concept within palliative care is that of "total pain," a term coined by Dame Cicely Saunders, the founder of the modern hospice movement, in 1967. Total pain recognizes that suffering is not solely a physical experience, but rather one that encompasses psychological, social, and spiritual dimensions as well.[3] These domains are interrelated and often compound one another.[4] A case study examining total pain in a 15-year-old male with recurrent T-cell lymphoma illustrates this complexity. The young man's cancer journey left him with deep emotional and existential trauma. The report describes his pain across all four dimensions: physical pain—a persistent, dull 9/10 chest pain; psychological pain—adjustment disorder linked to his deteriorating condition and trauma from witnessing another patient's death; social pain—feelings of isolation from peers and guilt over the burden placed on his family; and spiritual pain—a loss of meaning and identity. Only through coordinated interdisciplinary care addressing each of these layers was he able to achieve comfort at the end of life.[5] Non-physical sources of suffering are both identifiable and treatable—and addressing them can profoundly enhance a patient's quality of life.[6,7]

In practice, the focus on physical symptom control frequently leads to patients being prescribed multiple medications in an effort to manage pain, dyspnea, constipation, and other distressing symptoms. While pharmacologic interventions can be essential, polypharmacy may lead to challenges such as adverse drug interactions, medication intolerance, or patient preference for non-pharmacologic approaches. In these situations, osteopathic manipulative treatment (OMT) may serve as a valuable adjunct, offering symptom relief while potentially reducing overall medication burden.

## What is Osteopathic Manipulative Treatment?

Osteopathic manipulative treatment is a hands-on, manual technique practiced by doctors of osteopathic medicine that reflects the osteopathic philosophy of treating the whole person—mind, body and spirit. OMT involves the skilled use of the physician's hands to diagnose, treat, and support the body's natural ability to heal itself in a holistic manner.[8] While commonly associated with musculoskeletal complaints such as back and neck pain,[9] OMT can also be beneficial in managing a wide range of conditions relevant to palliative and hospice care, including bowel dysfunction,[10,11] dyspnea,[12] lymphedema, and anxiety.[13] Family physicians trained in osteopathic principles are uniquely positioned to integrate OMT into their practice, including end-of-life care. Treatments are individualized to each patient's presentation, addressing physical, emotional, mental, and even spiritual aspects of health. In this way, OMT aligns closely with the principles of total pain and whole-person care that is the basis of both palliative medicine and the osteopathic approach.

## Current Research on OMT

Research on OMT in the United States has largely focused on alleviating specific symptoms, particularly those commonly encountered in both primary care and palliative settings, such as back pain and dyspnea. One of the most well-known studies, the OSTEOPATHIC Trial, was a randomized, double-blind, sham-controlled study that examined the effects of OMT and ultrasound therapy on patients with chronic low back pain. The results demonstrated that OMT was effective in providing short-term pain relief and, notably, that patients receiving OMT reported reduced use of prescription pain medications.[14]

In another study investigating the impact of OMT on postoperative recovery, researchers examined outcomes such as time to first flatus and hospital length of stay in general surgical patients. The study found that those who received OMT postoperatively experienced a shorter time to return of bowel function and a reduced hospital length of stay.[15] This suggests the potential role of OMT in improving surgical recovery and reducing hospitalization costs.

In addition to the physical symptoms, OMT has also been studied for its impact on psychological conditions, including anxiety and depression. Although research in this area remains limited by small sample sizes and heterogeneity in study design, the results have been promising and support the need for further investigation. Developing research indicates that OMT may help reduce symptoms of anxiety[13] and depression,[16,17] particularly when used as an adjunct to standard treatment options.

A unique feature in OMT research is the use of a "sham OMT" group, often employed as a placebo control. In these studies, practitioners replicate aspects of OMT—such as positioning and light touch—without applying actual osteopathic techniques. Interestingly, sham OMT groups have sometimes demonstrated improvements as well.[18] While placebo responses are a natural consideration, this phenomenon may also be attributed to the therapeutic value of human touch[19] and the clinician's presence—concepts deeply embedded in both palliative care and osteopathic philosophy. In the context of serious illness, the benefits of touch extend beyond physical contact to include the intentional, compassionate presence of the clinician. This form of non-verbal communication can provide reassurance, reduce anxiety, and foster a sense of connection and dignity at a time when patients are most vulnerable.[20]

Osteopathic manipulative treatment naturally incorporates this principle—blending skilled, hands-on techniques with attentive, holistic care. The act of touch in OMT is more than a mechanical intervention; it conveys empathy, attentiveness, and a commitment to treating the whole person. In palliative and hospice care, where traditional curative treatments may no longer be appropriate, the healing power of touch—when delivered with clinical skill and compassionate intention—can have profound effects on both symptom relief and emotional well-being.

## Research Incorporating OMT with Hospice and Palliative Care

Research on OMT for symptom relief continues to grow; however, investigation into its use within the palliative care population remains largely understudied and underrepresented in American medical literature. Some international studies have reported beneficial effects of OMT in end-of-life care settings.[21,22] It's important to note that in many other countries, osteopaths are non-physician manual practitioners, whereas in the United States, DOs are fully licensed physicians trained in both conventional medicine and osteopathic principles. This dual training allows DOs to provide OMT alongside comprehensive medical management.

A small body of research has explored the use of OMT in pediatric oncology populations, an area similarly lacking in literature. One study involved interviews with children, caregivers, and oncology providers, revealing a general lack of awareness about OMT. However, after brief education, participants expressed interest in incorporating OMT as an adjunct to standard supportive care.[23] A second study examined the safety and feasibility of integrating OMT into pediatric oncology outpatient visits. It found that OMT was not only safe but could also be feasibly administered during routine chemotherapy sessions.[24] These early findings are promising and may suggest a potential role for OMT as a non-pharmacologic modality to enhance symptom relief alongside standard treatments. However, both studies were limited by small sample sizes, which impacts their relevance to broader populations. This emphasizes the need for larger, more rigorous investigations to better define the role of OMT in palliative care.

## Conclusion

Family physicians play an integral role throughout a patient's life, and their presence becomes especially vital during serious illness and at the end of life. Their longstanding relationships and deep understanding of a patient's history and values position them uniquely to provide compassionate, holistic care that addresses the multidimensional aspects of suffering—physical, emotional, social, and spiritual. Osteopathic manipulative treatment embodies many of these same principles. As a hands-on, patient-centered approach, OMT has shown promise in alleviating a wide range of symptoms commonly encountered in both primary and palliative care. While the body of research supporting OMT is expanding, its application in palliative and hospice populations remains significantly underexplored. Given the alignment between osteopathic philosophy, total pain, and the goals of palliative care, OMT represents a valuable, underutilized tool in end-of-life care. Further high-quality research is needed to better define its role, guide clinical application, and ensure that patients at their most vulnerable can benefit from the full scope of care that osteopathic family physicians are uniquely qualified to provide.

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# Doctors and Midwives: Then and Now

*By Thomas C. Rosenthal, MD*

In 1843, one of the world's most used obstetrics textbooks declared that not more than one case [of childbirth] in five or six hundred required the use of instruments.[4] Twenty-first century practice depends on a complex web of prenatal specialists, obstetrical surgeons, family physicians, midwives, and technologically oriented birthing units. Finding a balance of interventions that promote healthy infants and non-traumatized mothers has challenged modern medicine's struggle to provide seamless, integrated care. Importantly, maternal and child survival has improved, but since the end of the nineteenth century birthing has become the domain of hospital-based physicians. Many families seek a more intimate approach.

Dr. Jabez Allen arrived in East Aurora, New York, in the spring of 1834. He was newly graduated from Castleton Medical College in Vermont, but sought his fortunes on America's frontier, settling in the western New York village of East Aurora. His first delivery occurred while he was still constructing benches to serve patients waiting in the front room of his newly rented office on Main Street.

A hatless, flustered, perspiring man in shirt sleeves burst in, demanding Dr. Allen's urgent attendance at his wife's labor. Obviously a man used to telling people what to do, he had already checked out the town's two established doctors and found they were out on calls. Grabbing his medical bag, Jabez followed the anxious gentleman to East Aurora's largest home, a brick extravagance at the east end of town.

The bedroom scene did nothing to calm anyone's jitters. The midwife pulled Jabez towards the perspiring mother while she told him of a prolonged and arduous labor and a baby still high of the pelvic inlet. Her advice was dismemberment and extraction of the infant before the mother's strength gave out. Taking out his short wooden stethoscope, Jabez confirmed an audible infant heartbeat and strong regular contractions. It was a bad time to explain that neither forceps, cephalotribe, nor crotchet hook had yet been delivered to Dr. Allen's new office.

The decorum emphasized in his training dictated that all eye contact between physician and patient during pelvic exams was to be avoided. So Jabez placed the woman on her left side and began his exam. His insides panicked as he discovered the baby was in a transverse lie with a presenting shoulder. In a voice so calm it surprised even Jabez, he explained that repositioning was essential to delivery. He did not explain that he had read about the maneuver in DeWees' textbook, but had only performed a transition while helping one of his father's cows deliver a malpositioned calf. Urgent circumstances, called for action, not excuses.

Jabez withdrew ten ounces of blood from the mother's arm after also giving her a dose of laudanum, both measures known (at the time) to blunt the discomfort of labor. He then lubricated the vagina with fresh lard and inserted his left hand to match his wrist flexion to the contours of the birth canal. Almost immediately, a contraction painfully intensified his awkward position. However, being the mother's fifth term pregnancy, once the uterus relaxed, he accomplished repositioning in relatively short order. Delivery of a baby boy pursued.

Limp and blue, without evidence of spontaneous efforts to breathe, Jabez wiped the infant's face and applied mouth to mouth stimulation. Within a couple of puffs, the child announced his intent to survive with a modest cry. He passed the child to the midwife, who promptly gave the child a tablespoon of warm molasses to purge the meconium. Once a complete placenta was delivered, the uterus relaxed, shedding copious amounts of lochia that Jabez controlled with firm abdominal massage.[8]

A cautious midwife's concern about prolonged labor provided Dr. Allen's fortunate encounter with Mr. Harry Persons and his wife, Altie. A man of finance and a prominent farmer in the area, Mr. Persons urged Jabez to visit his wife and newborn son every day for the next week and Jabez readily agreed. Years later, Dr. Allen acknowledged that his tactful regard for the attending midwife and being seen walking up the long sidewalk to the Person's home was a great way to build his practice and start his fifty years serving East Aurora. He was frequently called in to assist in problem deliveries and reciprocated by requesting midwife consultations for women facing anxiety or depression postpartum.

Obstetrics, called midwifery in 1833, is the art of aiding women through pregnancy and childbirth. Learning midwifery has always been a challenge. Nearly twenty years later, Dr. James Platt White of Buffalo Medical College arranged for a pregnant volunteer to be observed, respectfully examined, and delivered in the presence of twenty-two medical students. The incident attracted international scrutiny and a lawsuit claiming indecent behavior.[6]

Nineteenth-century medical colleges taught the basics of obstetrics and midwifery on manikins. Forceps, developed in 1720, decreased the need for dismembering a fetus with a cephalotribe (forceps with teeth) or a crotchet hook, but their application required skill that was difficult to learn on a manikin. Yet it was in

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these one in twenty cases that midwives called for the doctor.[4]

Midwifery practice has been documented in Egyptian hieroglyphs. Greeks and Romans describe women serving as midwives, calling them nature's servants tasked to give every opportunity for nature to perform its work. Even in early Rome, women were encouraged to stay active through pregnancy and to consume a varied diet of fruits, vegetables, meat, and dairy. Restorative sleep was considered essential for the well-being of both the mother and the growing fetus.[2]

Medical care in 2025 is more involved, but the basics are the same and those requiring technological interventions still amount to about one in twenty, or 5%. Midwife-directed deliveries in low-risk pregnancies are associated with reduced medical interventions, lower rates of cesarean sections, epidurals, and episiotomies; delivered with improved patient satisfaction. Their typically longer prenatal visits may contribute to fewer preterm births and higher rates of breastfeeding.[5]

More than half of America's rural counties no longer have local access to obstetric services. Those counties experience an increased number of out-of-hospital births, preterm births and a doubling of infant mortality rates. Counties with obstetrical services are often led by obstetric trained family physicians and report outcomes similar to urban care units. An examination of pregnancy outcomes in rural New York hospitals with fewer than 500 deliveries annually found that family physicians obtained a consult in 36% of cases. Only half of those consultations resulted in a transfer of care to the obstetrician and only 2% of patients required transfer to a regional referral center. Labors averaged almost one hour longer than standard labor curves, likely because the overall cesarean section rate was 13.5%, or a little over half the rate in urban centers.[9]

Free-standing birthing centers offer another model of maternity care. Those patients who enter a birthing center in labor, rural or urban, achieve a vaginal birth 94% of the time. These are low-risk pregnancies, but with a U.S. cesarean rate of 27% in low-risk pregnancies, birthing centers do well at 6%. Five percent of patients hoping for, and planning a freestanding birth center delivery, were referred to a specialty center before term. Twelve percent were transferred to a hospital during labor, 2.0% transferred after giving birth, and 2.2% of the newborns were transferred after birth. Most transfers (82%) were first time pregnancies.[3]

Maternity and delivery services represent an obvious area for integrative health care. Operative backup and anesthesia must be available within 30 minutes, presenting a challenge when many rural America communities are 29 miles, or more, from a hospital. The National Rural Health Association (NRHA) supports expanding the scope of practice and reimbursements that support team approaches to maternal services. Such plans involve nurse practitioners, physician assistants, nurse midwives, certified midwives, and non-traditional providers, such as doulas and community health workers, who have established relationships with regional centers. Quality studies show that outcomes in low-risk pregnancies performed at low volume rural hospitals are comparable to urban and large-volume facilities.[10]

Care maps and protocols implemented in low-volume centers have been shown to achieve standardized quality goals for most conditions studied. Care maps and shared protocols facilitate seamless interaction with referral centers when specialized skill sets or technology are required.[1]

Effective teams require well integrated skill sets by providers who pride themselves on how well they worked together. Teams align a group's function into a new whole, with a common direction, and a synergy that limits wasted energy. Effective teams use individual talents to enable problem solving, even in complex situations. Such lofty goals require a high level of trust, respect for different viewpoints, and an interdependence that supports decision making.[7]

So, just as Jabez collaborated with a village midwife in 1834, the hugely expanded opportunities of today's medical practice require teamwork. Still today, the exceptional nature of each patient requires individualized care designs. The world's best health systems depend on the family physician to connect the dots.

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# Integrating Traditional Chinese Medicine into Primary Care in NYS and Beyond

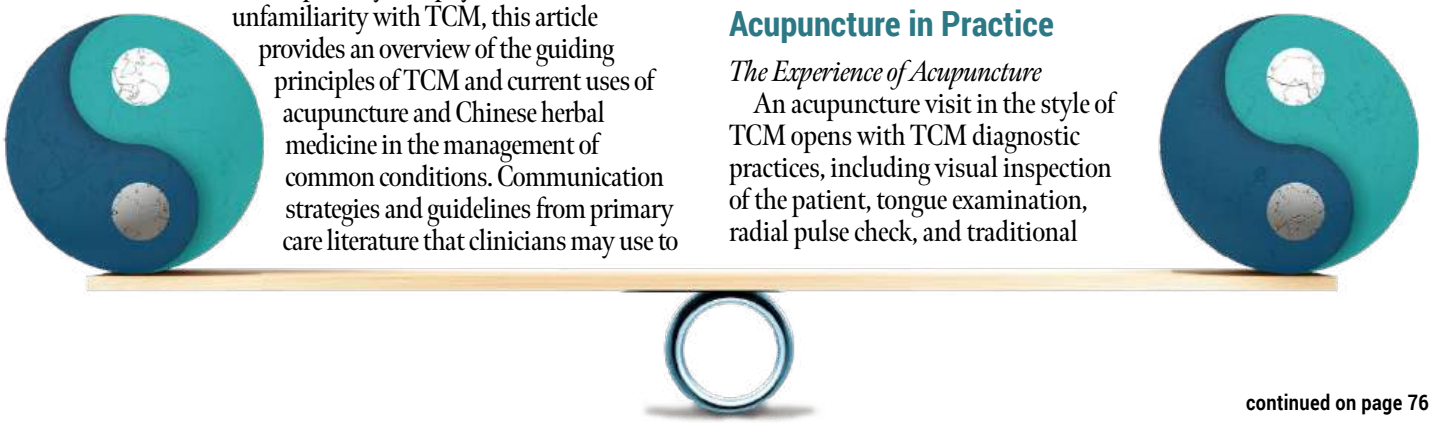
*By Anne Nguyen; Sara Siddiqui; Aldo Alleva, MD; Keasha Guerrier, MD and Barbara Keber, MD*

## Introduction

Traditional Chinese medicine (TCM), also known as Chinese medicine, refers to a constellation of psychological, physical, and herbal approaches such as acupuncture, tai chi, and herbal medications that aim to create balance in the body.[1] While TCM has been practiced in the US within Chinese immigrant communities since the first wave of Chinese immigration during the Gold Rush, TCM reached the American mainstream in the 1960s.[2] Its two most popular modalities, acupuncture and Chinese herbal medicine, have become mainstays within complementary medicine practices and research. Acupuncture's introduction to the American public via recommendation of President Richard Nixon's personal physician in 1972 as well as its integration within the Black Panther Party's medical services, has made it the most used modality of TCM in the US. In 2017, over 14 million Americans used acupuncture, with many reporting symptom relief.[2] Although not as widely used as acupuncture, Chinese herbal medicine has not only a traditional user base among first generation Chinese American immigrant populations, but also is the subject of active biomedical research for treatment of chronic conditions like type II diabetes mellitus.[3]

As more Americans turn to TCM to treat increasingly common chronic conditions like musculoskeletal pain, fatigue, migraines, and addiction, more primary care clinicians face the challenges of managing pharmacological and cultural interactions between Western medicine and TCM.[2] However, there are few well-publicized resources and guidelines to provide clinicians with an adequate knowledge base to counsel patients with confidence about the risks and benefits of TCM. Lack of physician familiarity with TCM could lead to underutilization in the case of acupuncture[4] or difficulty managing potential toxicities with concurrent Western and Chinese herbal medication use.[5] Furthermore, as patients consult both Western medicine physicians and TCM practitioners, lack of communication between these providers could impede optimal patient management, as the WHO acknowledges in its *Traditional Medicine Strategy 2014-2023*.[6]

To address the gap between rising patient use of acupuncture and Chinese herbal medication and primary care physicians' (PCPs) unfamiliarity with TCM, this article provides an overview of the guiding principles of TCM and current uses of acupuncture and Chinese herbal medicine in the management of common conditions. Communication strategies and guidelines from primary care literature that clinicians may use to discuss TCM with patients and TCM practitioners will be addressed. Finally, in response to concerns about fragmentation of care experienced by patients using both Western medicine and TCM, this article will introduce broader strategies to integrate TCM within the New York State and American healthcare systems.



## Principles of Traditional Chinese Medicine

Comprising a variety of practices developed over 5000 years, traditional Chinese medicine is rooted in a holistic view of the universe as a channel of *qi*, or energy.[7] In this way, body organs and tissues as well as body and mind are intrinsically connected through channels of *qi*, through which energy is in continuous flux. The primary goal of TCM is to maintain balance and harmony of these energy flows, also known as *ying yang*. Patients, with the help of TCM practitioners, must take care to ensure balance of the 5 elements—water, wood, fire, earth, and metal—or else they could experience 6 types of excesses—wind, cold, heat, dryness, dampness, and summer heat.

Disease through the TCM framework is considered bodily manifestations of *ying yang* imbalance, and accordingly, treatments aim to restore balance of the 5 elements in the entire body system. In contrast to Western medicine, which involves treatment standardized to each disease state, TCM philosophy calls for treatments tailored to each individual's core organ energy imbalances over time.[7] For this reason, a new generation of physicians trained in both Western medicine and TCM argue that TCM could be considered a form of precision medicine, where treatment is informed by patients' unique molecular makeup.[8]

Advocates for the integration of TCM into Western medicine also point to TCM's holistic world view, which understands a person's disease state as a result of mind, energy flow, and environment, as a framework that Western medicine is still in the process of adopting via the biopsychosocial model of health.[1] As both TCM and Western primary care share the goal of caring for the patient as a whole person in the context of their community and environment, primary care providers could look to TCM for inspiration for more holistic prevention and treatment strategies.

## Acupuncture in Practice

*The Experience of Acupuncture*

An acupuncture visit in the style of TCM opens with TCM diagnostic practices, including visual inspection of the patient, tongue examination, radial pulse check, and traditional

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questioning. The acupuncture practitioner inserts hair-thin needles at "Ashi points," or tender points, along certain meridians, or channels of energy flow in the body. Needles are inserted until the practitioner feels that the tissues are grabbing the needle or the patient experiences *de qi*, described as a sensation of heaviness, soreness, and tingling that may migrate, at one or more needling site.[9,10] Patients may experience strong needling sensations, as well as adjuvant therapies including herb administration or moxibustion, which is the burning of *Artemisia vulgaris* on or above acupuncture points. Visits also often include self-care recommendations, mostly dietary counseling and exercise. Most patients describe acupuncture as calming and relaxing, regardless of treatment efficacy.[9] Acupuncturists and patients usually agree on a treatment course of about 10 sessions, depending on treatment efficacy and patient needs.[9]

Adverse events related to acupuncture include infectious events, such as endocarditis, septicemia, hepatitis B, and HIV; trauma-related injuries such as pneumothorax, spinal cord injuries, cardiac tamponade, and severe bruising; and psychiatric changes, such as depression, insomnia, convulsions, menstrual disturbance, and increased pain.[11] However, these instances are rare.

*Current Uses of Acupuncture*

The American College of Physicians and the American Pain Society, based on meta-analyses of randomized control trials including 20,000 patients has endorsed acupuncture for the treatment of pain.[12,13] Primary care physicians recommend patients for acupuncture treatment most often for musculoskeletal pain, acute and chronic lower back pain, knee osteoarthritis, and chronic headache and migraine pain that has not resolved after visiting physical therapists, rehabilitation medicine specialists, neurologists, rheumatologists, and other specialists.[13,14] While the mechanism of action of acupuncture treatment is not fully understood, studies have indicated that acupuncture might have effects on endogenous opioid release as well as the limbic system, which regulates cognitive and emotional response to pain.[9] Acupuncture could also mediate local responses such as local vasodilatation and inhibition of proinflammatory cytokines IL-1 and IL-6.[9,13] In the wake of the opioid crisis, acupuncture appears to be an increasingly attractive non-addictive option for the management of chronic pain, which affects a quarter to a third of US adults.[13]

Acupuncture shows promise for the treatment of chronic pain in individuals with comorbidities such as PTSD, major depression, anxiety, and somatization, such as refugees and survivors of torture.[12] As numerous studies have suggested that abdominal, neck, and back pain in refugees could be physical manifestations of emotional distress, it is possible that conventional Western pharmacological and psychological therapy do not sufficiently address the multifactorial origins of pain for traumatized refugees.[12] Acupuncture used in conjunction with standard treatment may offer an optimal blend of Western and indigenous healing strategies that view the mind and body as intrinsically connected, according to a 2012 study based in the Boston Medical Center for Primary Care. The study found that acupuncture, with its folk origins, could be particularly approachable to patients from diverse countries, who stated in interviews that they liked healing practices like those in their homelands that were "not in a pill form." Acupuncture therapy also seemed to be effective in reducing pain: out of 50 patients who received acupuncture therapy, 56% experienced a reduction in pain over the course of treatment, with others reporting improved sleep and energy levels.

One such patient was a female Ugandan refugee in her mid-40s, who had survived torture including sexual assault and severe beating around her head, face, and chest wall. She reported extreme sensitivity and fear of being touched around the areas of her beating as well as "continuous pain on the right trunk, just below her breast and over her ribs." Topical lidocaine and ibuprofen provided her no relief from the pain. During the acupuncture visit, acupuncturists explained the concept of meridians, energy flow channels that traverse the whole body, and reassured her that by needling points on her hands and feet, they would be able to target her pain without touching her ribs. The patient attended 5 sessions over 7 weeks, a period over which her pain dropped from 4/10 to 1/10. She reported to her primary care provider after completion of these sessions that her pain had completely resolved. Stories like this demonstrate how patient education and treatment plans tailored to individual trauma can be harnessed in acupuncture practice to provide relief to patients with particularly complex presentations of pain.

Acupuncture has also been used in the primary care-based management of chronic conditions such as depression and IBS outside of and in conjunction with musculoskeletal pain, resulting in small but statistically significant reductions in symptom severity.[15,16] This indicates that acupuncture could show therapeutic benefits for patients from lower-income and underserved backgrounds with a high baseline of disability and chronic pain, as found in the 2012 ADDOPT (Acupuncture to Decrease Disparities in Outcomes of Pain Treatment) study based in the Bronx, NY.[17] A follow-up study found a clinically and statistically significant reduction of pain in over 30% of patients enrolled in the study.[18] More importantly, the ADDOPT study found that despite difficulties with transportation and scheduling, over 72% of patients attended at least 5 acupuncture sessions, suggesting that acupuncture is a treatment modality that patients with significant disability and pain are committed to incorporating into their care routines.

*Barriers to Acupuncture Use*

While primary care physicians are likely to suggest acupuncture to patients with symptoms best managed with alternative treatments, such as severe chronic pain, lower back pain, neck pain, and headache, numerous studies have suggested that physicians underestimate their patients' willingness to try acupuncture.[19,20] Primary care physicians were selective about the patients they referred to acupuncture, prioritizing factors such as perceived patient openness to and previous experience with complementary and alternative treatments. However, surveyed patients were more open to alternative treatments like acupuncture than physicians predicted, as long as they received reassurance from their physician that it would improve their health.[20]

Cost and insurance coverage are also limiting factors in the incorporation of acupuncture into primary care: a survey of 45 commercial, Medicaid, and Medicare Advantage plans showed that only one third of plans covered the cost of acupuncture treatments, meaning that the majority of patients pay for acupuncture out-of-pocket, with median prices ranging from $40 to $150 depending on geographic location.[21,22] Moreover, insurers only cover acupuncture for a limited range of conditions and providers. Since 2020, Medicare Part B, for instance, only covers acupuncture administered by physicians, nurse practitioners, and physician assistants for chronic lower back pain with no known cause.[23] Still, commercial insurance coverage for acupuncture, depending on the plan and the state, is becoming

increasingly common: many major private insurers like Aetna, United Health, Blue Cross Blue Shield, Cigna, and Kaiser Permanente, as well as federal employees' medical insurance plans, include acupuncture in their coverage, often as part of wellness benefits.[24] Partnering with acupuncture schools and administering acupuncture in group sessions, which has been shown to have no effects on treatment efficacy, could lower costs of treatment and make acupuncture more accessible to patients with low incomes.[18]

Another barrier to effective acupuncture treatment is lack of communication between Western PCPs and acupuncturists.[20] A 2015 qualitative analysis of care coordination between Western and acupuncturist providers showed that there was no systemic way to share information between Western clinicians and acupuncturists, and patients became responsible for relaying information between both parties. However, patient reporting to physicians was found to be spotty and inconsistent, as most patients did not report acupuncture treatment information because their PCP never asked them. As a result, PCPs emerged unsure of the efficacy of acupuncture for their patients.

*Communication & Integration Strategies*

There is a need for continuing education courses for Western primary care providers, both to increase awareness of conditions that are effectively treated with acupuncture and to craft communication strategies to manage patient expectations about acupuncture's efficacy.[9] Acupuncture performed by primary care physicians has improved outcomes with a collaborative communication style, with care to choose Western versus TCM language depending on patient body language; verbal explanations of what sensations to expect during process of needling; and debriefing sessions after acupuncture to evaluate treatment outcomes.[25] This attention to open communication and continuity of care with the same physician during acupuncture increased patient receptiveness to TCM.[26] Primary care physicians and patients can find more general information about acupuncture and TCM from the National Center for Complementary and Alternative Medicine at the NIH (https://www.nccih.nih.gov/health/traditional-chinese-medicine-what-you-need-to-know).

Additionally, to achieve maximal benefit of acupuncture treatment, there must be improved integration of acupuncture into American primary care. Two modes of integration are possible: 1) obtainment of additional training in acupuncture by the PCP, and 2) establishment of a close relationship with an acupuncturist referral partner. Physicians may find information about training programs and board certification in medical acupuncture from the American Academy of Medical Acupuncture (https://medicalacupuncture.org/) and the Council of Colleges of Acupuncture and Oriental Medicine (https://www.ccahm.org/ccaom/default.asp). As found in the American military, where acupuncture has long been integrated into conventional healthcare, physician acupuncturists need support from healthcare administrators to provide more allocation of appointment times and space.

## Chinese Herbal Medicine in Practice

*Common Chinese Herbs and Risks*

Chinese herbs have been a subject of drug research since the discovery of the anti-malarial drug artemisinin, with current research investigating the benefits of traditional Chinese herbal medicine for the treatment of common chronic conditions such as diabetes mellitus type 2 and addiction.[1,3,12] Traditionally, Chinese herbs, such as ginseng, huang-qi, aloe, dandelion, garlic, gingko, prickly ash, and turmeric, have been used by 90-95% of patients in Chinese immigrant populations in the form of concoctions with a variety of herbal and animal ingredients.[5] In these communities, patients often self-medicate Chinese herbs for musculoskeletal pain, abdominal pain, general malaise, and general health promotion.[27] Of importance is the use of Chinese herbs as an adjuvant for traditional cancer therapy among Chinese American women, who use herbal medicine to treat the side effects of cancer treatment, and fight fatigue, nausea, and vomiting.[28,29]

Although Chinese herbal medicine does have demonstrated efficacy, primary care physicians should be aware of the risk of toxic drug interactions between Chinese herbal medicine and Western pharmaceuticals. In-vitro research has indicated that certain herbal treatments can interact with cytochrome P450 metabolism and warfarin.[23] Herbal medication has also been associated with hepatic damage, nephropathy, hematopoietic damage, cardiovascular damage, and neuropsychiatric consequences.[24] These interactions are especially important for primary care clinicians to consider when managing herbal-anti-cancer drug interactions for cancer patients. For instance, St. John's wort can decrease plasma levels of the active metabolite of irinotecan, leading to undertreatment of advanced colorectal and lung cancer. However, only 5% of Chinese American cancer patients using herbal medication report their herbal medicine use to their PCPs and oncologists because their physicians did not ask them directly.[24]

*Barriers to Effective Use of Chinese Herbs*

Due to lack of cultural familiarity with and regulation of Chinese herbal medicine in the US, Chinese herbal medicine can lead to severe adverse effects not common in China and Taiwan.[5] US consumers are not aware that herbs should not be taken continuously or with certain drugs. Additionally, in the US, herbs do not undergo traditional processes of detoxification, leading to a higher risk of toxicity.

*Communication and Integration Strategies*

To mitigate risks of drug interaction and toxicity, primary care physicians should take care to ask patients, especially from the Chinese immigrant community, if they take herbal medication. There is also a need for continuing education courses for pharmacists, physicians, dentists, and TCM practitioners to increase awareness of drug interactions and toxicities. Finally, regulatory agencies between China and the US should collaborate to ensure consistent safety guidelines for American consumers of Chinese herbal medication.[5]

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# Osteopathic Manipulative Treatment for Depression: A Patient-Centered Adjunct in Primary Care

*By Jincy Cherian, DO and Sarin Itty, DO*

## Introduction

Major depressive disorder (MDD) is a prevalent and often disabling condition, affecting nearly 20% of individuals at some point in their lifetime.[1] While pharmacologic and psychotherapeutic interventions are foundational, many patients experience inadequate symptom relief or express interest in complementary options. Osteopathic manipulative treatment (OMT), an intervention grounded in the principles of osteopathic medicine, offers a potential adjunctive therapy that targets neurophysiologic and somatic contributors to depressive symptoms and is intended to complement, not replace, established treatments.

OMT's potential benefits stem from its capacity to modulate autonomic nervous system (ANS) function, address somatic dysfunction, and improve patient-reported outcomes. This article reviews the mechanisms, clinical evidence, and practical considerations surrounding the use of OMT in depression, with a focus on commonly employed techniques and their physiologic effects.

## Mechanisms and Rationale for OMT in Depression

OMT may benefit individuals with depression through its effects on autonomic imbalance, a hallmark feature commonly observed in mood disorders which can be debilitating. Depression is frequently associated with heightened sympathetic activity and diminished parasympathetic tone, contributing to physiologic manifestations such as insomnia, gastrointestinal dysfunction, fatigue, and chronic pain.[2]

The rationale for using OMT in this context is grounded in the core tenets of osteopathic medicine, which emphasize the interrelationship of structure and function, the body's self-regulatory and self-healing capacities, and the unity of body, mind, and spirit.[4] These principles support the use of manual interventions to optimize physiologic function and promote health.

OMT seeks to restore autonomic balance, alleviate somatic dysfunction, and support homeostasis by modulating neural, vascular, and lymphatic systems. This is achieved through gentle, targeted techniques that address restrictions in the musculoskeletal system known to impact autonomic outflow.[3] Specific techniques—particularly those targeting the cranial base, thoracic spine, and diaphragmatic function—have demonstrated the capacity to enhance vagal tone, an emerging physiologic biomarker associated with emotional resilience, reduced systemic inflammation, and improved mood regulation.[5]

## Core Techniques in OMT for Depression

Osteopathic manipulative treatment for depression typically employs a combination of techniques designed to modulate ANS function and address somatic dysfunctions commonly seen in mood disorders. The most frequently utilized techniques in this context include occipitoatlantal decompression, thoracic inlet release, rib raising, and various cranial manipulative procedures such as the cranial vault hold and compression of the fourth ventricle (CV4).[4,6,7]

- **Occipitoatlantal decompression** targets the cranial base and upper cervical region, aiming to reduce tension at the cranial-cervical junction and influence vagal outflow. This technique is hypothesized to enhance parasympathetic activity, which is often diminished in depression.
- **Thoracic inlet release** addresses fascial restrictions at the thoracic outlet, potentially improving lymphatic drainage and neural flow.
- **Rib raising** is applied to the thoracic paraspinal musculature to decrease sympathetic tone and promote parasympathetic activity.
- **Cranial techniques**, including the cranial vault hold and CV4, have demonstrated specific autonomic effects in controlled studies. For instance, the cranial vault hold has been shown to decrease low-frequency heart rate variability and increase skin blood volume amplitude, consistent with enhanced parasympathetic tone.[6,8,9] CV4 has also been associated with increased parasympathetic activity, as measured by heart rate variability (HRV) metrics.

Clinical trials and meta-analyses evaluating OMT protocols incorporating these techniques report modest reductions in depressive symptoms (Hedges' g = −0.47 overall; −0.61 in pain populations) and increased markers of parasympathetic activity (e.g., skin conductance, HRV), particularly in adults with comorbid pain syndromes.[10,11]

A randomized controlled trial in patients with chronic neck pain found that a protocol including these techniques led to significant improvements in depression, sleep, and fatigue compared to waitlist controls.[11] Mechanistic studies using thermal imaging and HRV further support the autonomic effects of these interventions, demonstrating increased vagal modulation and region-specific changes in facial temperature following OMT.[8,9,11]

While few studies isolate individual techniques, the collective application of cranial, thoracic, and soft tissue methods appears effective in improving both depressive symptoms and autonomic regulation.[12,13] Available safety data suggest these techniques are well-tolerated, with no serious adverse events reported in clinical trials.[13]

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## Clinical Evidence and Outcomes

Beyond mechanistic studies, the clinical efficacy of OMT for depression is supported by multiple trials and systematic reviews:

- A 2025 meta-analysis of 20 randomized controlled trials involving manual therapies, including OMT, reported a moderate pooled effect size (Cohen's d ≈ 0.6) for symptom reduction in depression.[10]
- In a 2019 RCT, patients receiving an OMT protocol for chronic neck pain experienced a mean BDI-II score reduction of 8.3 points compared to 3.1 in controls ($p < 0.01$), with concurrent improvements in sleep and energy.[11]
- Controlled studies on CV4 and cranial vault techniques show increased HRV, decreased sympathetic tone, and improved affect regulation.[7,8]
- Functional neuroimaging has also demonstrated limbic modulation (e.g., amygdala and anterior cingulate deactivation) following OMT, suggesting changes in emotional processing networks.[8,11]

These studies support the idea that OMT may function through bottom-up modulation of autonomic and limbic circuits.

## Comparison with Other Integrative Modalities

OMT shares therapeutic territory with yoga, acupuncture, and mindfulness-based interventions, which have also shown efficacy to varying degrees in regulating autonomic and affective symptoms.[14] However, OMT is uniquely delivered by osteopathic physicians as well as non-osteopathic physicians who have osteopathic hands-on training and can be integrated into clinical visits—making it a practical and flexible option in family medicine. Brief, targeted sessions can be incorporated into routine appointments, aligning with the demands of primary care workflows. Some physicians may also prefer to have osteopathic-only sessions in order to have sufficient time to utilize multiple techniques to optimize the effects for the patient.

The patient-centered and hands-on nature of OMT reinforces the therapeutic alliance and supports holistic care. Progress can be monitored using standardized tools such as the PHQ-9 or GAD-7 for mental health monitoring, while somatic dysfunctions may be tracked over time. Treatment is generally well-tolerated and suitable for a wide range of patients, including those with chronic pain or autonomic symptoms as well as for pediatric and geriatric populations. Techniques should only be performed by trained practitioners to ensure efficacy and safety.

## Conclusion

OMT is a promising adjunctive approach for depression that aligns with osteopathic principles and the biopsychosocial model of care, intended to augment—not replace—standard pharmacologic and psychotherapeutic interventions. By addressing somatic dysfunctions and modulating autonomic balance, techniques such as occipitoatlantal decompression, thoracic inlet release, rib raising, and cranial methods may support improved emotional regulation and patient well-being. Though further research is needed to isolate effects and define optimal protocols, current evidence supports the integration of OMT into primary care treatment strategies for depression.

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# The Association of Sleep Disorders and Poor Wound Healing: A Relationship Worthy of Addressing

*By Jet Murphy; James Murray, DO and Mathew Devine, DO*

## Overview

The prevalence of skin and subcutaneous disease cases was estimated to be approximately 605,036,000 in 2015 and is only increasing.[1] As a result of this, there has been an increased economic burden on the healthcare system from additional healthcare utilization, and a significant impact on the health-related quality of life for these patients.[1,3] Some authors argue that adequate sleep is essential in promoting wound healing and improving the quality of life in patients with chronic wounds; however, this relationship has not been fully investigated.[6] In this work, we will discuss the pathophysiology of sleep in relation to wound healing. We will explore how adequate sleep can decrease cortisol and promote an anabolic state necessary for wound healing through an effect on the cell cycle and protein synthesis.[6] We will review the pathophysiology of obstructive sleep apnea, a common disease encountered in a primary care setting, and its relationship to altered fibroblast function and wound dehiscence.[8] We will investigate insomnia, the most common sleep disorder, and how this disease may hinder wound healing. Lastly, we will discuss current best practices for screening and non-pharmacological healthy sleep hygiene, along with highlighting gaps in our knowledge around sleep and wound healing outcomes.

## Introduction

The incidence and prevalence of chronic wounds; such as venous, arterial, pressure, and diabetic ulcers; has been increasing in both the outpatient and inpatient setting.[1] Specifically, there were 605,036,000 cases of skin and subcutaneous disease in 2015, with the current incidence rising.[1] Chronic wounds are defined as "wounds that fail to proceed through the normal phase of wound healing in an orderly and timely fashion."[2] Compounding the increasing prevalence of chronic wounds, patients often underreport the development of new wounds.[1] This may be due to some wounds not initially being acutely painful in cases like a venous ulcer when compared to an arterial ulcer. This may lead to a more severe and complex wound ulcer, and one that may lead to worsened outcomes.

Due to the increased prevalence and frequent severity of chronic wounds, there has been an increase in healthcare utilization, morbidity, and mortality in this patient population. This increased prevalence of chronic wounds has resulted in higher hospitalization costs. Wound-related amputations specifically resulted in an average hospitalization of $12,851 to $16,267 for patients with comorbid diabetes in a systematic review conducted between 2000 to 2015.[3] An article comparing chronic wound prevalence and treatment costs among Medicare beneficiaries from 2014 to 2019 found that expenses shifted from hospitals to physicians' offices.[4] Although overall treatment expenditures decreased from $29.7 billion to $22.5 billion during this period, costs borne by physicians' offices increased from $3.0 billion to $4.1 billon.[4]

A more holistic approach in primary care should embrace the promotion of healthy sleep and screening for sleep disorders, which can reduce patient morbidity, mortality, healthcare utilization, and reduce the large economic burden associated with chronic wound management.

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## Wound Healing and Sleep Physiology

A wound can be defined as damage or disruption of superficial epithelium or deeper anatomic structures (e.g., dermis, hypodermis, adipose, muscle) leading to an altered function of structures.[5] Wound healing can be broken down into four steps: coagulation and hemostasis, inflammation, proliferation, and wound remodeling. Chronic wounds fail to progress through the normal wound healing process. Hypoxia, infection, inflammatory mediators, exudate, and necrosis often prolong one of the stages of wound healing leading to a chronic wound.[5]

Healthy sleep, a less commonly discussed topic within primary care, has been associated with improved wound healing.[6] Few have explored the specific link between healthy sleep and wound healing; however, there does seem to be a clear connection between adequate oxygenation and wound healing. Han et. al strengthens this assertion, reaffirming the essential role oxygen plays in forming the ATP necessary for collagen synthesis, tissue generation, and angiogenesis.[7] Hypoxia is the common link between impaired wound healing and poor sleep, which suggests the importance of understanding common sleep disorder pathophysiology.

Before discussing the pathophysiology of common sleep disorders, it is important to briefly review the physiology of normal sleep because alterations in this cycle have the potential to change perceived oxygen signals to the brain and cause hypoxia.[8] The normal sleep-wake cycle consists of wakefulness, stage N1 (NREM 1), stage N2, stage N3, and REM sleep, each with characteristic EEG patterns when coupled with measures of muscle tone and eye movements allow those stages to be quantified. Multiple cycles of NREM and REM sleep occur throughout the night, with a complete cycle occurring between approximately 90-120 minutes. Approximately 4-8 cycles of sleep occur within an 8-hour sleep period. As the night progresses, the amount of time spent in N3 decreases, with the amount of time spent in REM increasing. Healthy sleep promotes restorative function, the increased clearance of metabolites, and promotes the formation of new neuronal connections.[8] Disruptions of the sleep cycle can alter these vital functions leading to impaired healing, as outlined below. While it is not completely understood how each specific stage of sleep alters physiology, there does seem to be direct evidence that alterations in sleep architecture can disrupt the clearance of metabolites, brain plasticity, and sleep's restorative function. Specifically, adenosine, a metabolic byproduct that accumulates throughout the day is not cleared effectively with poor sleep, due to decreased interstitial space and altered glial cell function.[8] The accumulation of metabolic byproducts, such as adenosine, has the potential to alter normal wound healing physiology. One can believe common sleep disorders, such as obstructive sleep apnea and insomnia, exacerbate this process.

## Common Sleep Disorders Pathophysiology

Obstructive sleep apnea (OSA), a commonly encountered sleep disorder within primary care, is characterized by intermittent pharyngeal airway collapse leading to hypopnea or apneic events throughout the night. Hypopnea can be defined as moderately reduced pharyngeal airflow despite continued respiratory efforts, while apnea is complete cessation of airflow.[9] The result of this is often hypoxia, hypercapnia, increased sympathetic activation, and resulting respiratory acidemia.[9] Interestingly, there is a correlation between patients diagnosed with chronic wounds and OSA. Approximately half of patients diagnosed with diabetic foot ulcers also have moderate to severe OSA.[10] This may be due to similar risk factors between diabetic foot ulcers and OSA such as obesity and male sex.[9] The shared risk factors between diabetic foot ulcers and OSA serve as a model in understanding how these risk factors lead to a vicious state of respiratory acidosis and inflammation. Hypoxemia and acidemia from OSA hinder the steps of wound healing as a result of oxidative stress, altered fibroblast function, and sympathetic nervous system activation. Sympathetic nervous system activation additionally impairs the restorative anabolism state of healthy sleep and shifts to a catabolism state due to an increase in cortisol, glucagon, and catecholamines.[6] This mechanism has yet to be investigated to a substantial degree in patients who do not possess comorbidities.

Insomnia, another common sleep disorder encountered within primary care, is characterized by difficulty initiating sleep, maintaining sleep, frequent nighttime awakenings, or early morning awakenings.[11] One study examined the relationship of self-reported wound healing impairment in young adults ages 18-30 with insomnia. The authors concluded that there was a significant relationship between self-reported wound healing and insomnia, daytime fatigue and poor sleep quality.[11] This may be due to alterations of the sleep wake cycle and increased sympathetic activity resulting in pro-inflammatory mediators and decreased anti-inflammatory mediators.

The mechanism surrounding insomnia and impaired wound healing is not completely understood. Although OSA is understood to be associated with hypoxemia, insomnia is not. The common link between insomnia and OSA appears to be fractured sleep. One proposed mechanism linking poor sleep and impaired wound healing is the adverse effect of sympathetic nervous system activation – common to sleep disorders. Other mechanisms still need further investigation.

## Screening for Sleep Disorders

Many of us may not think of an association between poor sleep and poor wound healing. But from what we have written one can see that the association is worthy of considering. Further, finding the time to elicit a sleep history can also be challenging. There are a variety of questions that can be asked to solicit a sleep history. Snoring, gasping, choking, excessive daytime sleepiness are all symptoms that raise suspicion for OSA. Questionnaires can also be helpful in identifying patients at risk for OSA. The STOP and STOP-Bang questionnaires are screening questionnaires that are useful for assessing OSA clinical risk. Snoring, tiredness, observed apnea, high blood pressure, BMI, age, neck circumference, and gender are assessed by the questionnaires. An answer of yes on the questionnaire scores a 1, while answering no scores a 0. A patient who scores a 0-2 is unlikely to have OSA, while a patient that scores between 5-8 has a high probability of having moderate to severe OSA.[12]

One of the most widely used screening tools for insomnia is the Insomnia Severity Index (ISA). This is a seven-item questionnaire that assesses the following domains using a Likert Scale (0 = no problem, 4 = very severe problem): severity of sleep onset, sleep maintenance, early morning awakenings, sleep dissatisfaction, interference of sleep difficulties with daytime functioning, noticeability of sleep problems by others, and distress caused by sleep difficulties. A score of 0-7 indicates no insomnia, 8-14 subthreshold insomnia, 15-21 moderate insomnia, and 22-28 severe insomnia.[13] These screening tools are useful in identifying patients at risk of OSA and insomnia, along with who may be experiencing delayed wound healing because of these sleep disorders. Despite the usefulness of these surveys, the best way to screen for sleep disorders remains to be a detailed history and physical examination.

## Treatment of Sleep Disorders

The treatment of choice in OSA is the use of a continuous positive airway pressure (CPAP) device. CPAP actively prevents upper airway collapse preventing hypoventilation, hypercapnia, hypoxemia and resulting respiratory acidosis.[9] In patients refractory to CPAP, or unable to use, surgical treatment with targeted hypoglossal nerve (THN) stimulation may be considered.[14] Mandibular advancement devices may also be considered. In many patients, therapies can be combined with other conservative measures such as weight loss, avoiding sedatives, and avoiding supine sleep.

The treatment of insomnia is complex as there are multiple etiologies and typically require a comprehensive assessment of sleep hygiene, sleep schedule, medications, substances, and medical, neurologic, other sleep, and psychiatric conditions. The first line treatment for chronic insomnia is cognitive behavioral therapy (CBT). The behavioral component consists of a stable bedtime, use of the bed for only sleep and sex, and good sleep hygiene (limit caffeine and alcohol, dark and quiet room, adequate exercise, avoid napping). The cognitive aspect focuses on avoiding anxious thoughts surrounding sleep, inappropriate expectations about hours of sleep, and practicing mindfulness and relaxation techniques.[15]

If insomnia is associated with severe distress, CBT is often combined with a pharmacologic agent. The key in picking an agent depends on the patient and whether they are having difficulty sleeping through the night or initiating sleep. Some of these medications include melatonin, ramelteon, dual orexin receptor antagonists, zaleplon and zolpidem (non-benzodiazepines), doxepin, gabapentin, and trazadone. The treatment of choice for both OSA and insomnia is patient specific and may include a combination of non-pharmacological and pharmacological treatment.

## Conclusion:

The incidence of chronic wounds has been increasing over the years resulting in an increase in both the economic burden and patient morbidity from this chronic disease. Normal wounds heal well when there is decreased oxidative stress, normal fibroblast function, and decreased sympathetic tone. Common sleep disorders, like OSA and insomnia, seem to impair this normal healing process. While not fully understood, there seems to be plausible mechanisms and some evidence that addressing sleep disorders benefits patients with chronic wounds. Obtaining a thorough sleep history may help to identify patients that may be at risk or potentially have some of these sleep disorders. We suggest that future research is needed to more clearly define the contribution of sleep disorders and their treatment regarding impaired wound healing. In the interim, we suggest considering sleep in the comprehensive care of wound patients. As family physicians we hope to encourage the routine screening for these sleep disorders to improve the quality of life for each patient.

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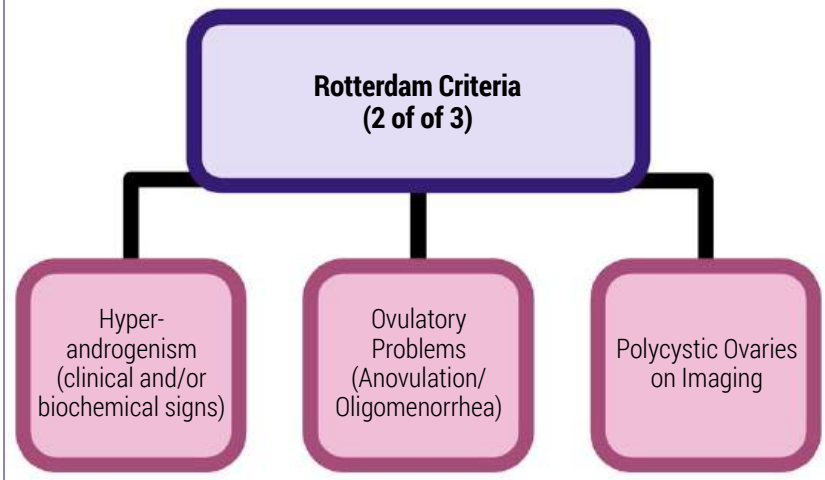
# Herbal Approaches in Hormonal Health: The Potential of Spearmint in Women with PCOS

*By Sarin Itty, DO; Tosin Quadri, DO and Carolyn Kwa, DO*

## Polycystic Ovary Syndrome

Polycystic Ovary Syndrome (PCOS) is a complex endocrine disorder characterized by hyperandrogenism, ovulatory dysfunction, and polycystic ovarian morphology. It can have reproductive, metabolic, and psychological health consequences. The preferred diagnosis of PCOS is by the Rotterdam criteria which requires 2 out of the 3 following: oligo- and/or anovulation, clinical and/or biochemical signs of hyperandrogenism, and polycystic ovaries by ultrasound[1] (refer to *Figure 1*). PCOS comorbidities include subfertility, increased risk of metabolic syndromes, type II diabetes, endometrial cancer, mental health conditions and obstructive sleep apnea (OSA).[2] As per the World Health Organization (WHO), PCOS affects 6-13% of reproductive aged women but nearly 70% of affected women are undiagnosed worldwide.[3] While the conventional therapies targeting symptom management through pharmacologic means are somewhat limited, there is a growing interest in complementary approaches – particularly the use of medicinal herbs to help improve patient outcomes.

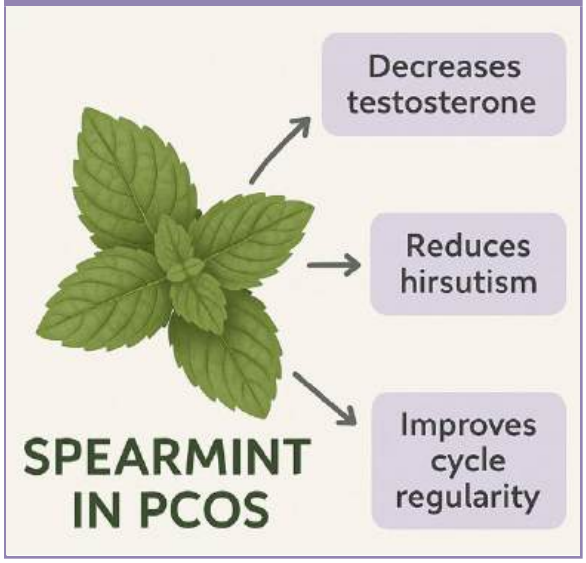
**Figure 1: Diagram Displaying Rotterdam Criteria**




## Spearmint

The essential oil and extracts in *Mentha spicata*, which is commonly known as spearmint, has shown antimicrobial, antioxidant, anticancer, anti-inflammatory and hepatoprotective effects.[4] Spearmint has been utilized for various purposes in research studies, demonstrating improvements in cognitive performance, and sleep and mood in individuals with age-associated memory impairment.[5] This article reviews the current literature on the role of spearmint in PCOS management and discusses its potential role within the integrative medicine setting. *Figure 2* illustrates some of the effects of spearmint use in PCOS.

**Figure 2: The Role of Spearmint in PCOS**




## Hyperandrogenism & Hirsutism

In a randomized controlled trial published by Grant in *Phytotherapy Research*, 41 participants were randomly assigned to take spearmint tea twice a day or a placebo herbal tea for one month. The purpose of this study was to investigate whether spearmint tea consumption would reduce androgen levels and the clinical symptoms of hyperandrogenism like hirsutism. The degree of hirsutism was rated by the Ferriman-Galwey score (objective assessment) and the modified Dermatology Quality of Life Index (DQLI, subjective assessment).[6] Free and total testosterone levels were significantly reduced over the 30 day period in the spearmint tea group; in addition to this, LH and FSH had increased, along with the subjective assessment of the degree of hirsutism being significantly reduced in the spearmint tea group.[6] There was no significant difference in the objectively rated scoring between groups.[6]

In an another clinical trial by Akdoğan et al., 21 female patients with hirsutism (12 with PCOS and 9 with idiopathic hirsutism) were studied for drinking spearmint tea for 5 days twice daily in the follicular phase of their cycle; treatment had led to a significant decrease in the free testosterone level and increase in

LH, FSH and estradiol.[7] Total testosterone and dehydroepiandrostenedione sulphate levels were not significantly reduced.[7] However, this study is limited due to its small sample size, short time frame of duration, inclusion of those with idiopathic hirsutism, lack of a placebo group, and other confounding variables.

## The Metabolic Impact of Spearmint in PCOS and Other Conditions

In a systematic review at meta-analysis of 6 RCTs published in *Frontiers in Endocrinology*, tea supplementation (green tea, spearmint tea, or marjoram tea) led to an improvement in body weight, fasting blood glucose, and fasting insulin when compared to the placebo group.[8]

In a research article published in *Endocrine Metabolic and Immune Disorders - Drug Targets*, *Mentha spicata* was evaluated to assess its effect on blood glucose in diabetic rats. Repeat oral administration of the *M. spicata* aqueous extract (20mg/kg[14]) led to a significant blood glucose lowering effect in these rats, which was found to be comparable to glyburide treatment at the dose used.[14] *M. spicata* had greater effects on the pancreas and liver, having beneficial impacts on pancreatic and hepatic histology, concluding that there is an antidiabetic effect of consumption of spearmint.[14]

In a study published in the *Iranian Journal of Pharmaceutical Research*, *M. spicata* aqueous extract produced a significant reduction in fasting blood sugar, total cholesterol, triglyceride, low density lipoprotein cholesterol and malondialdehyde (a byproduct of lipid peroxidation) in a population of diabetic rats.[15] However, the diabetic rats in this study received a higher dose of spearmint extract relative to human spearmint tea studies.

## Spearmint's Role in Addressing Ovulatory Dysfunction

In another study published in the *Journal of Ovarian Research*, a combination of spearmint and flaxseed extract administered by gavage was studied in PCOS induced rats (induced by an intramuscular injection of estradiol).[9] The combination extract (40 mg/kg hydroalcoholic extract of spearmint + 200 mg/kg flaxseed extract for 30 days) had improved the endocrine profile (significant increase in progesterone, decrease in testosterone/estradiol) and histomorphometric features (number of cystic follicles decreased and a significant increase in the primary, prenatal and antral follicles) of the ovary in the treatment group versus the control group.[9]

In a study published in *Advanced Pharmaceutical Bulletin*, spearmint essential oil was evaluated for its antiandrogenic effects in female rats with PCOS; the study results found that there was reduced body weight, testosterone level, ovarian cysts and atretic follicles, and increased Graafian follicles in PCOS rats.[10] With its antioxidant potential and through the reduction of weight and testosterone in PCOS induced rats, spearmint oil may have the potential to restore follicular maturation and induce ovulation.[10] Further studies would be needed to evaluate its effects on fertility.

## Forms of Use

Spearmint is consumed orally as spearmint extract or as tea; other forms include topical essential oils and isolated pure compounds. As per MedlinePlus.gov, spearmint extract is mostly often used by adults at a dose of 900 mg daily for up to 90 days and spearmint tea has been consumed as up to 2 cups daily for up to 16 weeks.[11] The Grant et al. group[6] had studied 2 cups a day for 30 days and the Akdogan et al.[7] group had studied a cup of 250 mL tea steeped with %20 g/dl M for 5 days during the follicular phase of cycle.

In an article published in *Letters in Drug Design & Discovery*, it was determined that carvone, the main constituent of spearmint essential oil, could cause a beneficial effect in PCOS due to it having the lowest binding energy (meaning a stable and stronger interaction) to the androgen receptor compared to other compounds studied.[13] Spearmint oil (topical form) can be diluted with a carrier oil. The topical form of spearmint oil in treating hirsutism has not been extensively studied within the literature in terms of clinical trials.

## Safety Profile, Side effects, Drug interactions, and Contraindications

No major adverse effects were noted within the studies reviewed, although herbs from the mint family can reduce lower esophageal sphincter pressure and exacerbate reflux and heartburn.[12] Patients should consult their healthcare provider prior to beginning any herbal or dietary intervention. It is important to be cautious with sedative drugs such as CNS depressants, since spearmint may cause sleepiness and slowed breathing.[12] Also, spearmint use should be avoided concurrently with hepatotoxic drugs, which increase the risk of liver damage.[12] Special populations including pregnant people, those who are breastfeeding and those with kidney or liver disease[12] should be careful with spearmint use. Spearmint oil can cause allergic or irritation reactions of the skin; a patch test should be performed prior to use.

## Conclusion

Spearmint tea has demonstrated potential anti-androgenic properties in a limited number of clinical trials, resulting in reductions in free testosterone levels and improvements in hirsutism among women with PCOS. Though the current evidence is preliminary, spearmint tea may offer a safe and accessible adjunct to conventional care. There are a limited number of randomized control trials on the use of spearmint in PCOS. Available studies are often only spanning a short time frame, are on a small scale and lacking long term data about effectiveness, safety and sustainability. More investigation is needed; however, spearmint tea use for a short time frame does seem to have benefits of symptom reduction in women with PCOS.

**continued on page 86**

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## Endnotes


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