The official peer-reviewed publication of the American College of Osteopathic Family Physicians

SPRING 2026
Volume 18 | Number 2
ofpjournal.com

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Osteopathic Family Physician (Print ISSN 1877-573X; Online ISSN 1877-5748) is published quarterly by the American College of Osteopathic Family Physicians. Postage paid at Chicago, IL, and additional mailing offices.

The paper used in this publication meets the requirements of ANSI/NISO Z39.48-1992 (Permanence of Paper).

USA POSTMASTER

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American College of Osteopathic Family Physicians
Membership Department:

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Chicago, Illinois 60631

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UPCOMING EVENTS

APR 15-19 2026
ACOFP 63rd Annual Convention and Scientific Seminars
Orlando, FL

DEC 4-6 2026
***OFP* Future Leaders Program**
Chicago, IL

JUN 12-19 2026
CME at Sea
Seattle, WA to Alaska

2026 CALL FOR PAPERS

OFP accepts original articles from clinicians who write succinct, evidence-based, authoritative review articles with an osteopathic component that will assist osteopathic family physicians in patient care.

OFP is actively seeking review articles, brief reports, and clinical images of general interest to osteopathic family physicians, as well as related to our topics of interest as listed below. Submit an article at https://mc04.manuscriptcentral.com/ofp, or view information about article categories. Patient Education Handouts are considered as part of a package with a review article.

Submissions by students must include at least one supervising physician who is familiar with the content of the article.

Please note that DO authors of articles are eligible for up to 10 AOA 1-B CME credits per article.

RESERVE A TOPIC

If you are interested in writing on one of the suggested article topics below, or if you have another topic in mind, you can reserve the topic by emailing the *OFP* Editorial Office. Please provide your name and the review title you would like to reserve. Once you reserve a review article topic, you will receive an email confirmation from ACOFP. This will initiate a 3-month deadline for submission. If the paper is not received within 3 months, the system will release the review article topic for other authors to reserve.

2026 CALL FOR PAPERS

Clinical Images

Clinical image submissions on all topics are welcome. Images must be accompanied by an appropriate patient model release. OFP is particularly interested in clinical images in the following topic areas:

- Dermatology, especially common skin ailments of people of color
- Pediatrics
- Radiology
- Rheumatology

REVIEW ARTICLES

SUMMER ISSUE

Suggested themes:

- Heat-related illness
- Sports medicine & outdoor activity
- Travel, vector-borne diseases, and pretravel counseling
- Preventive care, adolescent physicals
- OMT for musculoskeletal injuries
- OMT for common summer sports injuries
- Water-related injuries
- Dermatologic conditions in summer

FALL ISSUE

Suggested themes:

- Back-to-school health
- Vaccinations
- Respiratory illness season
- Mental health and stress: screening tools, seasonal affective disorder, screening and monitoring in pediatric / adolescent populations
- Chronic disease management resets
- Annual Diabetes Management Optimization: New medications, GLP-1 updates
- OMT & Musculoskeletal
- Patient Education Handouts related to review articles

WINTER ISSUE

Suggested themes:

- Winter respiratory illness
- Mental health, stress, burnout
- Chronic conditions exacerbated in the winter
- Pain management, COPD, depression/ seasonal mental health disorders
- Cold-weather injuries
- Osteopathic manipulative treatment for common musculoskeletal injuries in the winter
- Holiday-related health topics (cardiac risk, diet, alcohol, travel)

EDITOR'S MESSAGE

Caring for the Whole Patient, Every Day

Lindsay Tjiattas-Saleski, DO, MBA, FACOEP, FACOFP

The articles in this spring issue highlight the incredible breadth of family medicine. In these pages you will find discussions ranging from altitude sickness and preoperative optimization to osteopathic approaches to mastitis, febrile seizures, pediatric asthma management, and multidisciplinary care for patients with fibromyalgia. At first glance, these topics may seem unrelated, yet together they reflect the true nature of family medicine: caring for patients across their lifespan and addressing an extraordinary range of health concerns in everyday practice.

Spring brings longer days, warmer weather, and a sense of renewal. For family physicians, it also brings opportunities to encourage healthier habits: time outdoors, physical activity, and meaningful conversations about prevention and wellness. As osteopathic physicians, we remain grounded in caring for the whole person, recognizing the interconnectedness of body, mind, and environment. The diversity of topics in this issue reflects the diversity of the patients and communities we serve, and we hope these articles provide practical insights to support the important work you do each day.

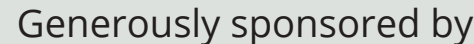
2026 FUTURE LEADERS

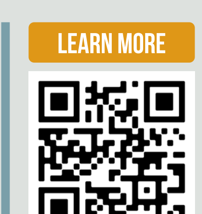
The 2026 Future Leaders program will feature two opportunities for early and mid-career physicians:

- Future Leaders 1.0, open to third-year residents and new physicians-in-practice (years 1-5), introduces core leadership principles and practical skills, equipping residents and new physicians with the tools to begin leading effectively within their teams and organizations.
- Future Leaders 2.0 supports physicians as they step into more advanced leadership roles and broader organizational impact.

Both conferences will take place December 4-6, 2026, in downtown Chicago, IL. Apply today and make this the year to give your career a jump start!

"From the moment I arrived, I felt genuinely welcomed, valued, and invested in. The intimate size of the conference is part of what makes it so powerful and unique—you're able to truly connect with everyone in just a short time. I walked away with a deeper understanding of myself and my role as a leader in medicine."
– Cassandra Levitske, DO





FROM THE PRESIDENT'S DESK

This address was delivered at a plenary session at ACOFP '26 in Orlando on April 16, 2026.

Greg D. Cohen, DO, FACOFP *dist*.

Good afternoon, honored friends, family, and of course all of you, my osteopathic family.

I am honored, grateful, excited, and humbled to be given the opportunity to serve you this year as President of the ACOFP. Most of you in this room know me. My name is Greg Cohen, DO, FACOFP dist. I have been a proud member of our organization for over 30 years. I've had the privilege of serving our profession in many, many roles over the years. I have been President of the Iowa Chapter twice. I have been President of the Iowa Osteopathic Medical Association twice. I have served on and chaired the Iowa Maternal Child Health Advisory Counsel. I have represented Iowa at our Congress of Delegates and the AOA House of Delegates for over 20 years each. I have served on multiple ACOFP committees including the Federal Legislation and Advocacy Committee, the Rural Residency Taskforce, the Delphi Long-range Planning Committee, and the Preceptorship Committee. I have served on the Board of Governors since 2017. I went to DMU and completed an osteopathic rotating internship and an osteopathic family practice residency at Long Beach Memorial Hospital in New York. Most importantly, I have been a proud practicing full-time osteopathic family physician serving the residents of Chariton, Iowa, a rural town of 4500 in southern Iowa, for the last 31 years. I have precepted students for more than 25 years. I've delivered more than 700 babies, performed my own C-sections, postpartum tubals, and colposcopies, and took care of my own hospital patients. I stopped covering the emergency room just this past Christmas. I was Lucas County Medical Examiner for over 20 years. I was also a partner and part owner of a small group practice for many years. Like most of us, I eventually sold my practice and became an employee.

Like many of you, I am a family man who has seen my share of life's curveballs. (Sorry, I like baseball). I was married to, loved, and cared tirelessly for my first wife, Marilisa, for 23 years until she lost her battle with breast cancer at the age of 41. I was blessed to find love again with Suse, and we have been married 17 years this week. Together, we have raised seven children who have blessed us with loving generous sons and daughters-in-law, and eight wonderful grandchildren (so far?) They have all shared in the joys and the sorrows, rewards, and sacrifices that have come with my lifetime in osteopathic medicine. I am grateful that many of them are here with us this week. I want them to know how much I love them and how proud I am of each and every one of them and the lives they have made. I am grateful to have my brother Michael, my sister Elizabeth, and their families, who closed their office and flew down from New York to celebrate today.

I am also grateful for my many extraordinary mentors and friends. Some are here today and too many are of blessed memory. Again and again, I have been able to benefit from their wealth of wisdom and experience. I'd like to thank Martin Diamond, David Leopold, Steve Rubin, my uncle Herb Cohen, Jeff Grove, Kevin de Regnier, Karen Nichols, Ira Monka, and Teresa Hubka. I'd also like to thank my partner of 31 years, Ken Anderson, my best friend these past 39 years, Doran Pruisner, my parents and grandparents, all of my fellow board members both past and present—and so many more. Their legacy of integrity, compassion, and duty has helped shape the servant leader I have become. I hope that I can adequately pay that debt forward to help the next generation of osteopathic students, physicians, and leaders.

Like most of us, I have seen my job get harder. Ever increasing paperwork and regulations, the explosion of technology into every aspect of our practices and lives. Increasingly intrusive, demanding, complicated, and inefficient EHRs, created not to make our lives easier or to improve the care of our patients but to collect data. Not only have they not improved care, but they have turned us into bad, expensive data entry clerks. Prior authorizations have delayed care, interfered with medical judgment, and damaged the doctor-patient relationship. That critical trust takes years to build and only moments to destroy. And then there's the increasing focus on production and numbers and the uncontrolled expansion of APNs, PAs, and other health professionals with less training and a never-ending hunger for increasing their scope of practice. Somewhere along the line, we all became providers. I don't know about you, but I didn't go to provider school. My diploma says "Doctor." Then there's the expansion of legislatively mandated CME topics, and a board certification process which seems to be constantly changing, confusing, expensive, and often unresponsive to our needs and concerns. AI is spreading like a fire across our profession, threatening to replace

or devalue the sacred importance of holistic care and human touch. A pandemic that threatened our lives, our health, and divided us as a nation. A pandemic that pitted healthcare workers and physicians against each other and our patients. Misinformation, social media, deep fakes, the attack on science, public health, and a world on fire!

Is it any wonder that burnout, malaise and anger are so pervasive and continue to rise in our medical students, residents, academics, and practicing physicians? None of these topics are new. In the past several years, we have had presentations touching on many of these at our conferences.

So where am I heading with this? Starting today, I want you to take a journey with me. A journey of mind, body, and spirit. A journey to find health. At this conference and throughout this year, we are going to talk about the hard stuff. We are going to share effective strategies. We are going to provide training and CME to help us learn to use these technological tools better and safer. We are going to talk about burnout, mental health, workplace culture, employment models, contracts, and even faith and medicine. For the next few days, we are all going to live in one of the "happiest places on earth." We're going to reconnect with old friends. We're going to make new friends. We're going to eat some good food. We're going to participate in some really high-quality osteopathic CME, and we're going to celebrate each other.

I have always enjoyed coming to our conferences. It has always felt like home and family. I enjoy sitting down next to someone I've never met knowing that, with all we have in common as osteopathic family physicians, the chances are good that I will like them, learn something, and make a new friend. I encourage all of you to do the same this week.

Throughout the year, the journey will continue. We will continue to have blogs, webinars, CME, and presidential messages. In June, we will be hosting our first annual destination CME, a cruise to Alaska. On sea days, we will be offering up to 15 hours of CME, enjoying entertainment and food. On days at port, we will be feeding our souls, experiencing some of the most beautiful and extraordinary wild places on earth—mountains, glaciers, wildlife, whales, and more. I urge you to consider joining us if you can.

In my year as President, I want to help us rediscover the joy of practice. Let's reclaim the feeling we had when we started on our journey in osteopathic medicine. We need to dig deep to rediscover the excitement, the passion, the enthusiasm, the awe…. the Calling.

In the coming year, my fellow Board members and I will be coming to visit many of you at state affiliate meetings, schools, and conferences. We will be expanding our partnerships and programs with your state associations. We will continue to work with the AOA and AOBFP with a goal of trying to encourage them to make the certification process simpler, more meaningful, less expensive, less intrusive, and osteopathic. We will continue to advocate for legislation that benefits us and our patients.

So that's my message. That is who I am and how I got here. That is my why. But before I finish, I want something from you. I want you to practice, to teach, to study, to learn, to make new friends…to find your joy. I want you to tell us when we're doing right and I want you to tell us when we're not. I promise we will always get back to you as soon as possible. Sometimes you will like our answers and sometimes you might not, but we will do everything in our power to continue to make this your osteopathic professional home. Our incredible leaders and staff are dedicated, talented, and here to serve.

What else do I want? I want you to talk to our students, residents, and fellow physicians, especially our young physicians. I want you to talk to them about coming to one of our meetings. They need to experience the fellowship, friendships, CME, and the magic that happens when our osteopathic family is together. They need to see why it is so important to join and participate in our state and national associations. We are all in this together. Thank you for what you do each day for your patients, your communities, and for our college. Thank you for the honor of allowing me to be your President.

God bless all of you on your journey to joy. God bless the ACOFP, and God watch over and protect our troop.

Thank you.

Greg D. Cohen DO FACOFP dist.

Greg D. Cohen, DO, FACOFP *dist.*
2026-2027 President, American College of Osteopathic Family Physicians

Contact Dr. Cohen at president@acofp.org.

REVIEW ARTICLE

Altitude Sickness

Gary MacDonald, DO, MS, FAAFP[1]; Holly Ingram, OMS-II[1]

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KEYWORDS

Wilderness medicine

High-altitude illness

Hypobaric hypoxia

Hypoxia-inducible factor

ABSTRACT

Altitude sickness encompasses conditions such as acute mountain sickness (AMS), high-altitude pulmonary edema (HAPE), and high-altitude cerebral edema (HACE), affecting individuals ascending to high altitudes without proper acclimatization. The fundamental cause is decreased barometric pressure, leading to reduced oxygen availability. Acclimatization is the body's adaptive response, involving respiratory, cardiovascular, pulmonary, hematopoietic, and cerebral circulatory adjustments. Key factors influencing acclimatization include the rate of ascent, altitude, individual susceptibility, and physical fitness.

AMS, the most common altitude illness, typically occurs above 2500 meters. Symptoms include headache, anorexia, nausea, fatigue, and lightheadedness. Diagnosis relies on reported symptoms. Prevention involves gradual ascent, limiting sleeping elevation gains, and prophylactic medications. Treatment includes descent, oxygen, acetazolamide, or dexamethasone.

HAPE is a potentially fatal condition with fluid leakage into the alveoli. Symptoms include dyspnea at rest, dry cough, and cyanosis. Diagnosis involves clinical assessment and pulse oximetry. Prevention includes gradual ascent and nifedipine for those with a history. Treatment requires immediate descent and oxygen therapy.

HACE, the most severe form, is progression from AMS, characterized by ataxia, severe headache, nausea, vomiting, and altered mental status. Diagnosis is based on clinical assessment. Treatment prioritizes rapid descent, high-flow oxygen, and dexamethasone.

Chronic mountain sickness (CMS) affects long-term high-altitude residents, marked by excessive erythrocytosis. Treatment involves descent, oxygen therapy, and medications like acetazolamide.

Awareness, effective prevention strategies, and prompt treatment are crucial to mitigate life-threatening complications associated with altitude sickness.

INTRODUCTION

Altitude sickness encompasses a range of conditions that can affect individuals ascending to high altitudes without proper acclimatization. This manuscript explores the pathophysiology, prevention, diagnosis, and treatment of these conditions, including acute mountain sickness (AMS), high-altitude pulmonary edema (HAPE), and high-altitude cerebral edema (HACE).

Altitude sickness impacts millions of individuals annually, particularly trekkers, climbers, and military personnel. Over 81 million humans reside at elevations above 2500 meters.[1] The increasing popularity of high-altitude destinations necessitates updated protocols to mitigate associated risks. It is estimated that up to 20%-25% of travelers to altitudes above 2500 meters develop AMS, underscoring the importance of prevention and timely intervention.[2]

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The authors have no relevant financial relationships or conflicts of interest to disclose.
Author Contributions: Gary MacDonald wrote the initial manuscript, assisted in editing, and prepared the manuscript for final submission. Holly Ingram performed the majority of editing, source verification, and citation.

Altitude and Hypoxia

The fundamental cause of altitude sickness is decrease in barometric pressure that accompanies increasing altitude, leading to reduction in the partial pressure of oxygen in inspired air and, consequently, reduced oxygen availability to the body. This reduced oxygen availability, known as hypoxia, sets off a series of physiologic adaptations that can result in altitude sickness if the ascent is too rapid for the body to adjust.[2-4]

Most healthy individuals tolerate elevations up to 3658 meters (12,000 feet) without significant oxygen desaturation.[2,4] At higher elevations, however, noticeable physiologic effects typically occur when arterial oxygen saturation falls below 90%.[2,4] This highlights the variability in individual responses to altitude, with some individuals experiencing symptoms at lower elevations, particularly those with underlying medical conditions.[5]

Acclimatization

Acclimatization is a complex physiologic process that enables the body to adapt to high-altitude environments, minimizing the consequences of hypoxia. Multiple organ systems contribute to these adaptations.[2,4]

Respiratory System

A key initial response to altitude is increased tidal volume and respiratory rate, known as hypoxic ventilatory response (HVR).2,4 This hyperventilation elevates the alveolar partial pressure of oxygen (PaO_2) but induces respiratory alkalosis. Renal compensation via bicarbonate excretion begins after 24-48 hours, causing metabolic acidosis to restore acid-base balance and allowing continued hyperventilation for improved oxygen uptake.[2,4] Individuals who acclimatize may develop increased sensitivity to hypoxia, possibly due to adaptations mediated by hypoxia-inducible factor 1 alpha (HIF-1α).[2,4,6,7]

Alveolar hypoxia triggers hypoxic pulmonary vasoconstriction (HPV), raises pulmonary arterial pressure, and can enhance ventilation-perfusion matching. However, uneven HPV can predispose to HAPE.[4,8,9] Hypoxia can increase microvascular permeability in the lungs and contribute to edema formation, exacerbating pulmonary edema.[2,3,10,11] Several mechanisms might be involved including the role of HIF-1α , upregulation of vascular endothelial growth factor (VEGF), and release of inflammatory mediators.[2,3,7]

Cardiovascular System

Initially, sympathetic activation involving epinephrine and norepinephrine release elevates heart rate, blood pressure, and pulmonary perfusion.[2,4] Over time, plasma volume reduction through diuresis lowers cardiac output, with heart rate returning closer to baseline, and sensitivity to catecholamines decreasing.[2,4]

Hematopoietic System

Diuresis and plasma volume contraction cause hemoconcentration, rapidly boosting the blood's oxygen content.[2,4] Hypoxia stimulates erythropoietin production, increasing red blood cell mass over several weeks, thereby enhancing oxygen-carrying capacity.[2,5,6] However, excessive erythrocytosis can contribute to chronic mountain sickness (CMS).[2,4]

Cerebral Circulation

At rest, the brain is responsible for 20% of the body's total oxygen consumption. In response to hypoxia, cerebral blood flow slightly increases, especially when PaO_2 falls below 60 mmHg.[2,4] This helps maintain adequate oxygen delivery to the brain.

It is important to note that acclimatization is gradual and varies among individuals. Factors influencing acclimatization include:

- It is important to note that acclimatization is gradual and varies among individuals. Factors influencing acclimatization include:
- Rate of ascent: A slow ascent rate reduces the risk of altitude sickness.[2,12]
- Altitude: Acclimatization capacity declines with increasing altitude.[2,4,8]Individual susceptibility: Genetics, age, gender, and history of altitude illness.[2,4,5,8]
- Physical fitness: Fitness does not prevent altitude sickness but may help individuals tolerate physical exertion at altitude.[2]

It is important to note that even with proper training and acclimatization, the body has limits in adapting to extreme altitudes. At altitudes above 5500 meters, physiologic impairment often surpasses adaptive mechanisms.[2,4]

ACUTE MOUNTAIN SICKNESS

Acute mountain sickness (AMS) is the most common form of altitude illness, characterized by a constellation of symptoms that typically emerge within hours to days of ascending above 2500 meters.[4,10,12] Hypoxia is a central cause, although the "tight-fit" hypothesis posits that individuals with reduced intracranial and intraspinal cerebrospinal fluid (CSF) capacity are more susceptible to AMS because there is less capacity to accommodate brain swelling.[4,8,10]

As brain volume increases at altitude, CSF volume must decrease to maintain intracranial volume, but these compensatory measures are finite. Once exhausted,

intracranial pressure (ICP) rises.[2,4,8] Certain activities such as lifting, valsalva maneuvers, or turning the head can transiently increase ICP, exacerbating symptoms.[8] This supports the tight-fit hypothesis, as these actions further increase intracranial blood volume. While ICP might not be elevated at rest in individuals with mild AMS, it can rise sharply during exertion.[8] Thus, fluctuating ICP may explain the headache that is a primary symptom of AMS, similar to patients with idiopathic intracranial hypertension without papilledema.[8] In moderate to severe AMS and HACE, ICP is definitively elevated.[2,8,12] Hypoxia-induced intracranial venous hypertension may also play a role, although its significance remains controversial.[8]

Diagnosis of AMS relies solely on reported symptoms, as there are no specific physical examination findings or laboratory tests.[2,5,8] The Lake Louise AMS score is a tool for assessing altitude illness, with points assigned for headache, gastrointestinal upset, and functional impairment, but it is not typically used for definitive clinical diagnosis.[12] The hallmark symptom is headache, often throbbing and frontal or global.[12] However, some debate exists about whether headache is mandatory, with some experts emphasizing an individual's overall functional status.[5,8,12] Additional symptoms include anorexia, nausea, fatigue, and lightheadedness or dizziness. Dehydration can also exacerbate or mimic AMS symptoms, complicating diagnosis.[5,8] It is important to consider the traveler's well-being and functional status when diagnosing AMS, given the lack of a definitive diagnostic gold standard. If an individual feels ill and must curtail daily activities soon after ascending above 2500 meters, AMS is highly likely.[5]

Prevention of AMS

A gradual or staged ascent is the most effective preventive measure.[5] Current guidelines suggest limiting sleeping elevation gains to ≤500 meters per day and adding a rest day every 3-4 days above 3000 meters.[5] This "climb high, sleep low" strategy reduces nighttime hypoxic stress when respiratory drive diminishes.[4,8] Acetazolamide aids acclimatization by promoting bicarbonate excretion (compensating for respiratory alkalosis) and stimulating ventilation.[2,5,8] Typical preventive dosing is 125 mg twice daily, beginning 24 hours before ascent and continuing during high-altitude exposure. Dexamethasone is a corticosteroid with anti-inflammatory and anti-edema effects, making it another prophylactic option, though long-term use is discouraged due to potential adverse effects.[2,5,8] While dehydration does not directly influence AMS susceptibility, adequate hydration is crucial for overall well-being at high altitude. Avoiding alcohol and sedatives, which can suppress respiratory drive and worsen hypoxemia, is also recommended.[2,4,5,8]

Treatment of AMS

The cornerstone of AMS management is descent—even 500-1000 meters can be sufficient.[5] In more severe cases, supplementary oxygen may be given to maintain arterial oxygen saturation (SaO_2) above 90%.2,5,8 Mild AMS often improves with acetazolamide, while more severe presentations benefit from dexamethasone to reduce cerebral edema.[5] Portable hyperbaric chambers (e.g., Gamow bags) can simulate descent by increasing barometric pressure and effectively raising local oxygen availability—though they should not replace an actual descent to a safer elevation.[2,4,5,8]

HIGH-ALTITUDE PULMONARY EDEMA

High-altitude pulmonary edema (HAPE) is a potentially fatal condition caused by fluid leakage from pulmonary capillaries into the alveoli, compromising gas exchange. It typically appears within the first 2-4 days at altitudes above 2500 meters.[2-4,9] Excessive pulmonary hypertension driven by HPV is central to HAPE pathogenesis, especially among individuals with an exaggerated HPV response, likely an inherent trait.[3,9] The severity of edema directly correlates with increase in pulmonary arterial pressure (PAP), as evidenced by the presence of protein and red blood cells in the lung fluid of individuals experiencing the highest PAP increases.[4,8]

The hallmark symptom of HAPE is dyspnea at rest, differentiating it from AMS. Early symptoms often mimic fatigue and decreased exercise tolerance, which can be mistakenly attributed to other causes.[2,5,8] A persistent dry cough develops, followed by cyanosis and progressively worsening shortness of breath, particularly at night. Tachycardia and tachypnea ensue as the condition advances.[2,5,8] In field settings with limited resources, the diagnosis of HAPE often relies on history and clinical assessment.[2,5,8] However, pulse oximetry, if available, can confirm hypoxemia disproportionate to the altitude, helping to distinguish HAPE from other causes of dyspnea like anxiety or poor physical conditioning.

Additional contributors include impaired alveolar fluid clearance, blunted HVR, and extreme nocturnal hypoxemia, forming a multifactorial pathophysiology.[2,5] HAPE often presents with dyspnea at rest, fatigue, dry cough, and cyanosis.[2,5,8] In field settings, diagnosis typically hinges on clinical presentation; in well-equipped medical facilities, pulse oximetry, chest radiography, and electrocardiography are recommended for HAPE evaluation.[2,5,8] Pulse oximetry can detect disproportionate hypoxemia, while portable ultrasound may show B-lines, a nonspecific sign of pulmonary edema.[5,8]

Prevention of HAPE

To prevent HAPE when traveling to higher altitudes, a gradual ascent profile remains key.[5,9] Nifedipine, a calcium channel blocker, is a recommended prophylactic agent for those with prior history of HAPE, generally started one day before ascent and continued until descent or after a few days at the highest sleeping altitude.[2,5] However, systematic studies are needed to determine optimal duration of nifedipine prophylaxis, with recommendations ranging from 4-7 days.[5] Tadalafil and dexamethasone show potential for HAPE prophylaxis, but current evidence is insufficient to supersede nifedipine.[5]

Treatment of HAPE

Immediate descent to lower elevation is the most crucial treatment for HAPE. Another essential component of HAPE management is to supplement with oxygen therapy to maintain SaO_2 above 90%.[2,5,8] While nifedipine lowers PAP, it offers no definitive outcome benefit when added to oxygen, rest, and descent.[2,5,9] Tadalafil or sildenafil (phosphodiesterase 5 [PDE-5] inhibitors) may help by enhancing oxygenation and reducing PAP, but further data are needed.[3,5,9] Temporary use of a portable hyperbaric chamber can be life-saving if descent or oxygen supplementation is unavailable, but descent is the primary intervention.[5]

HIGH-ALTITUDE CEREBRAL EDEMA

High-altitude cerebral edema (HACE) is the least frequent but most severe form of altitude sickness, manifesting usually within 1-3 days after arrival at high altitude; however, symptoms may appear later, even around 5-9 days for some individuals.[2,4,12] HACE represents a life-threatening progression from AMS, characterized by cerebral edema that can be vasogenic (fluid leakage from vessels) or cytotoxic (intracellular swelling).[2,4] Studies using lumbar puncture demonstrate that elevated CSF (pressure of >300 mmH^2O) is commonly observed in HACE.[8] Cerebral edema is also evident on imaging studies (computed tomography [CT], magnetic resonance imaging [MRI]), or confirmed during autopsy.[8] Small petechial hemorrhages were consistently observed in autopsies, with occasional findings of venous sinus thrombosis.[8]

Many individuals with HACE also have pulmonary edema, although it may be subclinical.[2,8] Early stages of HACE might be partially reversible, but untreated, progression leads to cytotoxic edema developing in gray matter, culminating in brain herniation and death.[2,4] Focal neurologic signs, such as third and sixth cranial nerve palsies, may develop due to brainstem distortion and extra-axial compression. These focal signs can make it difficult to differentiate cerebral edema from primary cerebrovascular events.[2,4,8]

Ataxia, especially truncal ataxia, is the defining clinical feature that helps differentiate HACE from AMS and HAPE.[2,5,8,12] It often precedes development of altered mental status, making it an early warning sign. Other symptoms include severe headache, nausea and vomiting, and progressive encephalopathy, which can culminate in seizures and coma. Similar to AMS, HACE diagnosis primarily relies on clinical assessment, particularly in the field.[2,5,8,12] The presence of ataxia and altered mental status in the context of recent altitude exposure strongly suggests HACE.[2,5,8,12] Exaggerated hypoxemia may be evident on arterial blood gas analysis or pulse oximetry. Additionally, clinical examination and chest radiography may reveal concurrent pulmonary edema, as HACE often coexists with HAPE.[5,8] In settings with advanced imaging capabilities, brain CT may reveal nonspecific findings such as compressed sulci and flattened gyri, along with white matter attenuation.[5,8] MRI provides more specific findings, characteristically showing high T2 signal in the white matter, particularly in the splenium of the corpus callosum, which is most prominent on diffusion-weighted images.[5,8] While these imaging findings are helpful in confirming the diagnosis, particularly retrospectively, initial diagnosis in the field necessitates reliance on clinical judgment alone.[5,8]

Treatment of HACE

As with other altitude illnesses, rapid descent is the priority.[5] High-flow oxygen improves cerebral oxygenation, while dexamethasone reduces intracranial swelling to reduce cerebral edema.[2,8] Portable hyperbaric chambers offer a temporary measure when immediate descent is difficult.[2,5,8] However, any delay in evacuation can lead to prolonged coma or permanent neurologic deficits and even death.[2,5,8] Even with prompt and appropriate treatment, some individuals may experience lasting cognitive or motor impairments.[2,5,8]

CHRONIC MOUNTAIN SICKNESS

Chronic mountain sickness (CMS) predominantly affects those living at high altitudes long term.[4,8] CMS is characterized by excessive erythrocytosis (elevated red blood cell count), leading to increased blood viscosity and symptoms such as headache, fatigue, dyspnea, and cyanosis.[2,4]

Definitive treatment is descent, after which symptoms often improve—though they recur with return to altitude.[4,8] Oxygen therapy (especially during sleep) can help, and phlebotomy may offer subjective relief, although objective benefits are limited.[4,8] Certain medications (e.g., medroxyprogesterone acetate, acetazolamide) can reduce hematocrit by enhancing oxygenation.[8] Acetazolamide, in particular, can improve nocturnal oxygen saturation, reduce heart rate and sleep apnea events, and decrease

hematocrit, underscoring the role of hypoventilation and nighttime desaturation in CMS pathophysiology.[2,8]

CONCLUSION

Altitude sickness poses significant risks to travelers who ascend to elevations above 2500-3000 meters. It can present in various forms, including AMS, HAPE, and HACE. Prevention is critical and involves gradual ascent, proper acclimatization, and use of prophylactic medications. Treatment typically includes descent to lower altitudes, supplemental oxygen, and pharmacologic therapy. Recent Wilderness Medical Society guidelines emphasize individualized risk assessment, slower ascent profiles, and prophylactic use of medications like acetazolamide and dexamethasone to ensure safety. Prompt recognition and intervention remain the best strategies for avoiding life-threatening complications.

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REVIEW ARTICLE

Managing Pediatric Asthma in Primary Care

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KEYWORDS

Pediatric asthma

Primary care

Preventative medicine

Asthma education

ABSTRACT

Asthma is the most common chronic lung disease of childhood, affecting approximately 6 million children in the United States. Its pathophysiology involves airway hyperresponsiveness and inflammation, which can lead to intermittent or persistent respiratory symptoms such as coughing, wheezing, shortness of breath, and chest tightness. The severity of disease ranges from mild intermittent symptoms to life-threatening airway compromise. Highlighting the complexity and individuality of asthma, this review will summarize the management of pediatric asthma within a primary care setting. By reviewing the etiology and recent nomenclature for the various subtypes of pediatric asthma, it aims to clarify the diagnostic process and the appropriate treatment algorithms. In addition, this review seeks to demonstrate the role of primary care in managing pediatric asthma to prevent exacerbations and improve children's overall health.

INTRODUCTION

Asthma is the most common chronic pediatric respiratory disease.[1] It is a complex multifactorial disorder characterized by bronchial hyperresponsiveness, intermittent airflow obstruction, and airway inflammation, affecting 14% of children worldwide, with an etiology attributed to interactions between genetics and a variety of host factors.[2-4] Prevalence and outcomes vary by age, sex, race, and socioeconomic status, with a higher disease burden observed among males during childhood, African Americans, and those living below the poverty line.[2,5] Low income has not only been associated with asthma prevalence but also with higher rates of exacerbations, hospitalizations, and critical care requirements.[5] Additional risk factors include personal or family history of atopy, secondhand smoke exposure, prematurity, low birth weight, obesity, and diverse environmental triggers.[3] These environmental factors include air pollution, tree pollen, wood pollen, influenza, and human rhinovirus.[6]

In addition to genetic, environmental, and comorbid factors, it is also important to consider the socioeconomic factors that impact asthma diagnosis and treatment. Low income has been linked to increased asthma prevalence, exacerbations, hospitalizations, and critical care admissions.[5] This relationship is likely multifactorial, as low income affects other social determinants of health, such as education, exposure to pests and pollution, and access to food and healthcare, which are all risk factors for asthma morbidity.[5] Lower educational attainment can reduce health literacy, directly influencing health outcomes.[5] Lack of insurance and access to care are important components, as fewer referrals are then made to asthma specialists, resulting in higher emergency room utilization for asthma, increased work and school absences, decreased consistency of providers, uncontrolled asthma, and overall worse asthma care.[5]

Despite all of these factors, the exact etiology of the development of asthma is unknown, and continued investigation into asthma pathophysiology, education, diagnosis, improved access, and treatment is necessary to prevent exacerbations.[7] Because pediatric asthma is frequently managed by primary care physicians or nonrespiratory specialists, implementing current asthma guidelines in nonspecialized care settings remains challenging due to their length and complex guidelines.[8] Improving asthma management in these settings requires primary care providers to recognize risk factors, establish an accurate diagnosis, initiate appropriate therapy, and support medication adherence.[8]

Presentation

The presentation of asthma varies depending on the individual and the severity of symptoms. Typical manifestations include wheezing, shortness of breath, and cough.[3] Obtaining a detailed history is essential and

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The authors have no relevant financial relationships or conflicts of interest to disclose.

should focus on the pattern of symptoms, precipitating factors, and risk factors.[2] Asthma should be considered when evaluating a child with a cough, particularly if it occurs predominantly at night or is triggered by a specific stimulus.2 Common triggers for asthma exacerbations include respiratory infections, exercise, weather changes, pollutants (domestic and environmental), secondhand smoke exposure, strong odors, strong emotions or anxiety, and certain medications.[3]

Wheezing is also a common symptom of asthma and results from inflammation and narrowing of the small airways.[3] It is important to note that many children experience wheezing in the first few years of life, but not all of them ultimately develop asthma.[3] Patients may also report chest tightness and shortness of breath. If the child is asymptomatic at the time of evaluation, the physical examination may be normal.[2] Children with asthma may also exhibit findings consistent with atopy including inflamed nasal mucosa, nasal discharge, sinus tenderness, eczema, atopic dermatitis, nasal polyps, and periorbital darkening.[2] Some children may present with asthma as part of the natural progression of the atopic march, which involves development of atopic dermatitis in infancy followed by allergic rhinitis and asthma during childhood.[9] In addition, excessive daytime fatigue and poor school performance may also indicate disrupted sleep due to nocturnal symptoms.[2]

During an acute exacerbation, symptoms become more pronounced and may include tachypnea, hypoxia, wheezing, and the use of accessory muscles. The child may also exhibit nasal flaring, tripod positioning, grunting, or inability to speak in complete sentences. Children presenting with these severe symptoms may be at risk for impending respiratory failure.[2]

Diagnostic Criteria

Pediatric asthma is diagnosed based on characteristic symptom patterns and supported by objective measures, when available.[3] The National Asthma Education and Prevention Program (NAEPP) and Global Initiative for Asthma (GINA) both provide evidence-based guidelines for diagnosis and management, classifying asthma as intermittent, mild persistent, moderate persistent, or severe persistent.[1,10] Figure 1 outlines the diagnostic criteria for each classification based on NAEPP guidelines.

Pulmonary function tests, including spirometry and peak expiratory flow (PEF), are used to assess airflow obstruction and reversibility.[3] These tests are generally considered reliable only in children aged 5 years and older, at which point they can help confirm a clinical diagnosis.[3,11] Spirometry is considered the gold standard for diagnosing asthma. Patients with asthma will demonstrate an obstructive pattern of breathing, with FEV_1 <80% predicted and FEV_1/FVC ratio <0.85. After the administration of a bronchodilator, an improvement in FEV_1 of more than 12% from baseline indicates significant reversibility.[2]

FIGURE 1: Asthma severity classification.[a] Severity levels include intermittent, mild persistent, moderate persistent, and severe persistent. These are classified based on a combination of symptom frequency and interference with daily life, as well as clinical measures.

FEV_1, forced expiratory volume in 1 second; FVC, forced vital capacity; SABA, short-acting beta agonist

Type	Asthma Symptoms
Intermittent	• Daytime symptoms <2 days per week • Nocturnal awakenings <2 per month • No interference with activities • Normal FEV^1 and FEV_1/FVC • Exacerbations <1 per year
Mild persistent	• Daytime symptoms >2 but <7 days per week • Nocturnal awakenings 3-4 nights per month • Minor interference with activities • Normal FEV_1 and FEV_1/FVC • Exacerbations >2 per year
Moderate persistent	• Daily symptoms • Nocturnal awakenings >1 per week but not daily • Daily use of SABA • Some activity limitation • FEV^1 60%-80% predicted; FEV_1/FVC below normal • Exacerbations >2 per year
Severe persistent	• Symptoms throughout the day and need for SABA several times a day • Nocturnal awakenings most nights • Extreme activity limitation • FEV_1 <60% predicted and FEV_1/FVC below normal • Exacerbations >2 per year

[a]Data adapted from the National Asthma Education and Prevention Program Coordinating Committee and Expert Panel Group[1]

Because spirometry may not be widely available in primary care settings, GINA supports use of PEF as an alternative measure.[10] PEF is assessed using an inexpensive hand-held device that measures the patient's ability to exhale forcefully.[11] Exhaled fractional nitric oxide (FeNO) is a noninvasive biomarker that is becoming increasingly available. If it is suspected that a child has asthma but there is diagnostic uncertainty, a FeNO level of 35 ppb or more is considered positive for airway inflammation.[12] FeNO may also help discriminate between wheezing phenotypes and predict future asthma development in preschool children, although diagnostic value for school-aged children is limited by insufficient evidence.[13] Symptom onset often occurs before the age of 3 years, which complicates early diagnosis.[3] In such cases, patients can be diagnosed and treated based on clinical suspicion, with confirmation deferred until they reach an age at which reliable testing is feasible.[3]

Despite established guidelines, patients are often diagnosed with asthma based on clinical presentation,

particularly when clinical symptoms, family history, environmental exposures, or atopic features strongly suggest asthma, and prompt treatment is necessary. However, GINA guidelines emphasize the importance of confirming an asthma diagnosis with objective testing to avoid unnecessary treatment, overtreatment, and overlooking of other significant conditions.[10]

Treatment

Current treatment strategies follow NAEPP guidelines and are stratified based on age and asthma severity (Figure 2).[1] Disease control should be assessed regularly using symptom-based measures, as poor control increases the risk of future exacerbations (Figure 3). For patients with worsening or uncontrolled symptoms, clinicians should evaluate adherence to the prescribed medication regimen, inhaler technique, environmental exposures, and comorbid conditions. If indicated, treatment should be stepped up to the next level, with control reassessed within 2-6 weeks.[1] When asthma has been well controlled for at least 3 consecutive months, stepping down therapy may be considered.[1] Consultation with an asthma specialist is recommended for children aged 0-4 years who reach step three or higher, and for children 5 years and older who reach step four or higher.[1]

Although evidence supporting OMT in pediatric asthma is limited, its use is grounded in osteopathic principles. Techniques such as rib raising and suboccipital release may help modulate sympathetic and parasympathetic tone and reduce viscerosomatic reflex activity.[14] Rib raising can alleviate restrictions by articulating the rib heads and increasing rib mobility, thereby facilitating more effective respiratory effort.[14] This technique can also influence diaphragm biomechanics, as the inferior ribs have direct diaphragmatic attachments, further improving respiratory function.[14] Given these physiologic mechanisms, OMT may serve as a helpful adjunct to standard asthma care, although further research is needed to clarify its clinical impact.[14,15]

Prevention

Prevention of asthma exacerbations and symptoms is essential to minimizing the inflammation to which children's lungs are exposed. Patient education is a critical component of disease management, including self-monitoring to assess asthma control and recognizing early signs of worsening symptoms, which can be achieved through symptom tracking or peak-flow monitoring.[1] Education on proper medication administration is also important. Patients should be counseled on correct inhaler technique, appropriate use of devices, and understanding the distinction between long-term control and quick-relief medications.[1] Many modifiable risk factors and triggers contribute to asthma severity, with obesity being a notable factor that can exacerbate pediatric asthma.[16] Consequently, promoting healthy lifestyle choices, such as weight control, exercise, and diet, is an important counseling point in management. Primary care physicians will play a pivotal role in reducing asthma morbidity through prompt and accurate diagnosis, adherence to treatment guidelines, and patient education to support effective self-management.

CONCLUSION

Primary care physicians are tasked with diagnosing and treating asthma within their pediatric patient population. Because asthma is a highly individualized chronic disease, clinicians must understand all aspects of care for children

FIGURE 2: Stepwise approach for management of asthma based on age and severity.[a] Guidelines are based on the 2020 Focused Updates to the Asthma Management Guidelines: A Report from the National Asthma Education and Prevention Program Coordinating Committee Expert Panel Working Group. These are the preferred treatments, but there are alternatives that can be used based on the individual's needs.

	INTERMITTENT ASTHMA	MANAGEMENT OF PERSISTENT ASTHMA				
Age	**Step 1**	**Step 2**	**Step 3**	**Step 4**	**Step 5**	**Step 6**
0-4 yrs	PRN SABA and At the start of RTI: add short course daily	Daily low-dose ICS and PRN SABA	Daily medium dose ICS and PRN SABA	Daily medium dose ICS-LABA and PRN SABA	Daily high-dose ICS-LABA and PRN SABA	Daily high-dose ICS-LABA + oral systemic corticosteroid and PRN SABA
5-11 yrs	PRN SABA	Daily low-dose ICS and PRN SABA	Daily and PRN combination low-dose ICS-	Daily and PRN combination medium-dose ICS-formoterol	Daily high-dose ICS-LABA and PRN SABA	Daily high-dose ICS-LABA + oral systemic corticosteroid and PRN SABA
>12 yrs	PRN SABA	Daily low-dose ICS and PRN SABA	Daily and PRN combination low-dose ICS-formoterol	Daily and PRN combination medium-dose ICS-formoterol	Daily medium-high dose ICS-LABA + LAMA and PRN SABA	Daily high-dose ICS-LABA + oral systemic corticosteroids + PRN SABA

[a]Table is adapted from the National Asthma Education and Prevention Program Coordinating Committee and Expert Panel Group[1]

ICS, inhaled corticosteroid; LABA, long-acting beta agonist; LAMA, long-acting muscarinic agonist; PRN, as needed; RTI, respiratory tract infection; SABA, short-acting beta agonist

FIGURE 3: Assessing control of asthma based on symptoms and medication use

COMPONENTS OF CONTROL	WELL CONTROLLED			NOT WELL CONTROLLED			VERY POORLY CONTROLLED		
	Ages 0-4	Ages 5-11 years	Ages ≥12 years	Ages 0-4	Ages 5-11 years	Ages ≥12 years	Ages 0-4	Ages 5-11 years	Ages ≥12 years
Symptoms	≤2 days/week	≤2 days/week but not more than once each day	≤2 days/week	>2 days/week	>2 days/week or multiple times on ≤2 days/weeks	>2 days/week	Throughout the day		
Nighttime Awakenings	≤1x/month		≤2x/month	>1x/month	≥2x/month	1-3x/week	>1x/week	≥2x/week	≥4x/week
Interference with normal activity	None			Some limitation			Extremely limited		
SABA Use for symptom control	≤2 days/week			>2 days/week			Several times per day		
Lung Function → FEV_1 (% predicted) or peak flow (% personal best → FEV_1/FVC	Not applicable	>80% >80%	>80% Not applicable	Not applicable	60-80% 75-80%	60-80% Not applicable	Not applicable	<60% <75%	<60% Not applicable
Validated Questionnaires → ATAQ* → ACQ* → ACT*	Not applicable	Not applicable	0 ≤0.75 ≥20	Not applicable	Not applicable	1-2 ≥1.75 16-19	Not applicable	Not applicable	3-4 Not applicable ≤15
Asthma exacerbations requirin oral systemic corticosteroids	0-1/year			2-3/year	≥2 year		3/year	≥2/Year	
	Consider severity and interval since last asthma exacerbation.								
Reduction in lung growth/Progressive loss of function	Not applicable	Evaluation requires long-term follow-up care.		Not applicable	Evaluation requires long-term follow-up care.		Not applicable	Evaluation requires long-term follow-up care.	
Treatment-related adverse effects	*Medication side effects can vary in intensity from none to very troublesome and worrisome. The level of intensity does not correlate to specific levels of control but should be considered in the overall assessment of risk.*								

Figure from the National Asthma Education and Prevention Program Coordinating Committee and Expert Panel Group[1]
ATAQ: Asthma therapy assessment questionnaire; ACQ: Asthma control questionnaire; ACT: Asthma control test

with asthma. Patient and family education should be a priority to prevent future exacerbations, and awareness of the obstacles each patient faces is essential for providing personalized care. Primary care providers should remain current with pediatric asthma classification, diagnosis, and treatment guidelines to provide the best care for their patients.

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REVIEW ARTICLE

Febrile Seizures: Clinical Manifestations and Management

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KEYWORDS

Febrile seizure

Febrile status epilepticus

Seizure

Febrile seizure prophylaxis

ABSTRACT

Febrile seizures are a common age-dependent phenomenon that affects up to 5% of children in the United States, typically between 6 months and 5 years of age. These seizures are triggered by a rapid increase in body temperature, most often due to an underlying viral illness. Febrile seizures typically occur shortly after the onset of fever and can present clinically as either generalized tonic-clonic or focal activity, depending on the classification. While febrile seizures often cause significant parental concern, most children recover fully without any long-term neurologic or developmental effects. The majority of febrile seizures are self-limiting and do not require immediate medical intervention or long-term pharmacologic prophylaxis. Risk of developing an initial or recurrent febrile seizure is influenced by several factors, including family history, child's age at the time of the first seizure, and presence of certain underlying medical conditions that may predispose the child to seizures. In this article, we will explore the underlying pathophysiology of febrile seizures, their clinical manifestations, and potential long-term consequences, as well as review current approaches for evaluating and managing affected children.

METHODOLOGY

A literature search was conducted using keywords related to febrile seizures in databases including PubMed and Google Scholar. Searches were limited to articles published in English within the last 20 years. Inclusion criteria were peer-reviewed journal articles and high-quality clinical reference sources (e.g., StatPearls) addressing febrile seizures in pediatric patients. Exclusion criteria were non-English articles, nonscholarly websites, and case reports. A total of 34 articles meeting inclusion criteria were reviewed. Findings were synthesized to highlight trends in epidemiology, risk factors, clinical manifestations, and management of febrile seizures.

INTRODUCTION

Febrile seizures are a common, age-related phenomenon, affecting up to 5% of children throughout the United States.[1] These seizures typically occur in the setting of an underlying illness, most commonly a viral infection that triggers a fever. Rapid rise in body temperature causes an excited state within the cerebral cortex, ultimately leading to a seizure.[2] Febrile seizures primarily affect young children, especially those between the ages of 6 months and 5 years. Febrile seizures may raise concerns about potential future neurologic issues, though the vast majority of children recover fully without lasting effects.[1] This article will provide a comprehensive overview of febrile seizures, covering their epidemiology, pathophysiology, clinical features, management strategies, and potential long-term effects on neurologic development, aiming to enhance understanding of this common yet often alarming condition.

Definition

A febrile seizure is an episode of convulsions triggered by a fever, typically characterized by a body temperature above 100.4°F (38°C).[3] The elevated body temperature alters electrical activity within the cerebral cortex, leading to an excited state that results in a seizure. Involvement of the entire cerebral cortex results in a generalized seizure, whereas a focal seizure results from unilateral cortical involvement, leading to focal neurologic activity during the seizure.[4] Cerebral cortex involvement contributes to the varying clinical manifestations of febrile seizures, which are further explained in the "Classification" section below.

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The authors have no relevant financial relationships or conflicts of interest to disclose.

Any underlying pathogen that causes fever can trigger febrile seizures, though they are most commonly linked to viral infections. However, even if the causative virus is identified in an ill child, it is not possible to predict the risk of a febrile seizure based solely on the viral species.[5] These seizures usually occur within the first few hours of illness, typically with a fever above 102°F (39°C). However, they can occur with lower fevers, potentially even before the child exhibits symptoms.[2] In general, likelihood of febrile seizures increases as temperature increases.[6] Of note, seizures that occur in the presence of an underlying central nervous system (CNS) infection, and seizures in children with history of prior afebrile seizures, are not included in this definition.[7]

Epidemiology

Febrile seizures are the most common neurologic condition seen in children, affecting about 5% of children in the United States and Western Europe. They typically occur between 6 months and 5 years of age, with peak incidence between 12 and 16 months, though rare cases have been documented as young as 3 months and as old as 7 years.[7] Febrile seizures tend to follow a seasonal pattern, with higher rates in winter, likely due to increased prevalence of viral illnesses.[8] There is accruing research on the relationship between temperature extremes and febrile seizures, which may also contribute to the increase in incidence in winter months.[9]

Data also suggest higher risk of febrile seizures in children of lower socioeconomic backgrounds. One study reported a prevalence of 5.6% in lower-income homes, versus 3.3% in higher-income homes (P=0.001).[10] Contributing factors may include parental health literacy, access to care, and insurance status.[6] There is a lack of research addressing the relationship between febrile seizures and healthcare disparities, highlighting the need for further study.

Risk Factors

Risk factors for febrile seizures include family history of febrile seizures (odds ratio [OR] 4.5, 95% confidence interval [CI] 2.09-9.83), viral illnesses (OR 3.5, 95% CI 2.2-5.6), high fevers (OR 1.8, 95% CI 1.3-2.5), and developmental delay (OR 4.9, 95% CI 1.55-15.5).[7] While there is no established pattern of inheritance, it has been found that having one sibling or one parent with history of febrile seizure puts a child at 20% or 33% increased risk of having a febrile seizure, respectively.[11] There are many proposed genes that are thought to play a role in increasing febrile seizure risk, although the exact translocation and method are unknown.[6] The SCN1A gene is widely regarded as the most common gene to be involved in epilepsy, with a variable range of severity.[12] Further research is needed on gene-environment interactions.

Several viral illnesses are associated with febrile seizures, including influenza, parainfluenza, enterovirus, adenovirus, respiratory syncytial virus, human herpesvirus 6 (HHV-6), and human metapneumovirus.[13] The seasonal peak in fall and winter supports this link.[8] Additionally, it is rather common for children to develop a fever after routine immunizations, such as measles-mumps-rubella (MMR) and 13-valent pneumococcal conjugate vaccine (PCV13). Fevers following vaccination increase risk for febrile seizure in genetically predisposed children. However, vaccination lowers overall risk by preventing viral infections that can trigger seizures.[7] Expert recommendations encourage maintaining the standard vaccination schedule and discussing concerns with the physician.

Classification

Currently, there are three acknowledged classifications for febrile seizures as depicted in Table 1: simple, complex, and febrile status epilepticus. Both simple and complex febrile seizures are time-limited events. A simple febrile seizure is generalized, lasting less than 15 minutes, and does not recur within 24 hours. After a simple febrile seizure, there is typically a brief postictal period, followed by a gradual return to baseline mental status without development of neurologic deficits. Complex febrile seizures may have generalized or focal onset, last between 15 and 30 minutes, can recur within 24 hours, and are often associated with lingering neurologic symptoms in the postictal period.[11] Alternatively, if a patient's seizure lasts longer than 30 minutes or if multiple seizures occur without regaining consciousness between episodes, the patient is considered to have febrile status epilepticus. This occurs when the body's inhibitory mechanisms fail to stop seizure activity; this is considered a life-threatening emergency.[13]

TABLE 1: Classification of febrile seizures.

<table>
<tr><th>SIMPLE</th><th>COMPLEX</th><th>STATUS EPILEPTICUS</th></tr>
<tr><td>15-minute duration
and
Only 1 seizure within 24 hours</td><td>> 15-minute duration
or
Multiple seizures within 24 hours</td><td rowspan="2">>30-minute duration
or
Multiple seizures without regaining consciousness between seizures</td></tr>
<tr><td>Generalized Onset</td><td>Generalize or Focal Onset</td></tr>
</table>

Acute Management

Most febrile seizures resolve before the patient reaches a medical facility. Early intervention or termination of simple febrile seizures is not required. However, prolonged seizure activity, such as febrile status epilepticus, rarely resolves on its own, highlighting the need for early intervention and medical management.[7] Early recognition and intervention of status epilepticus are shown to lower associated consequences such as acute need for intubation to longer-term sequelae including neurologic injury.[14] Benzodiazepines remain the first-line treatment for seizure termination, with the choice of agent depending on medication availability and available route for administration. Lorazepam is preferred over diazepam when intravenous (IV) access is available. If vascular

access is not established, intranasal (IN) administration of diazepam or midazolam is appropriate, or alternatively, midazolam can be administered via intramuscular (IM) injection.[15] Dosing is generally weight-based and varies depending on the agent and route of administration. Although these medications are known to be effective in children experiencing seizures of other etiologies, their efficacy in treating febrile seizures specifically is still not fully understood.[16] After the initial dose of benzodiazepine, the patient should continue to be monitored and the physician should be prepared to administer a second dose at the same dosage, if the seizure continues for another 5 minutes. If two doses of benzodiazepines are administered and the seizure persists, a second-line anticonvulsant should be given, as additional benzodiazepine doses increase risk of respiratory depression.[17] Second-line antiepileptic agents, including but not limited to fosphenytoin, phenytoin, levetiracetam, or phenobarbital, should be chosen based on medication availability and vascular access.[18] When managing seizure activity, it is essential to maintain a patent airway and continuously monitor the patient's hemodynamic status. For patients with medication-refractory status epilepticus, intubation is necessary for airway protection and ventilatory support. Choice of induction agents depends on medication availability and provider preference. While propofol and benzodiazepines are commonly used for their known antiepileptic properties, a recent small study in adults found that choice of induction agents had no impact on seizure incidence, duration of mechanical ventilation, or time to regain consciousness.[19] While stabilizing the patient, the appropriate clinical evaluation should be completed, which is outlined below.

Clinical Evaluation

Initial assessment

The majority of children experiencing a febrile seizure will no longer be seizing by the time of evaluation and typically do not require urgent intervention. However, if febrile status epilepticus is suspected, immediate intervention is critical, as it is unlikely to resolve spontaneously and poses a risk for neurologic injury.[7] For guidance on the medical termination and acute stabilization of febrile seizures, refer to the "Acute Management" section. Evaluation of a febrile seizure begins with a thorough history and physical examination. Key aspects of the history include previous seizure episodes, family history of febrile or afebrile seizures, recent illnesses, immunizations, medications, and relevant medical or birth history. It is also essential to obtain detailed information about the seizure event itself, such as duration, clinical features, and the child's level of activity before and after the seizure. Certain red flags, outlined in Table 2, are linked to increased risk of seizure recurrence.[20] Complete physical examination should be performed with focus on the child's mental status, ensuring no focal neurologic deficits, and assessing for signs of meningitis, such as increased irritability, nuchal rigidity and bulging of the anterior fontanelle.[21]

Additionally, the exam should look for signs of external trauma, possible tongue injuries, and incontinence. Nonfebrile causes of seizures should be considered, such as hypoglycemia or hyponatremia, and clinicians should be alert for signs of underlying epilepsy, including infantile spasms. Syncopal episodes, sleep disorders, and psychological conditions can mimic seizure-like episodes but are not true convulsions. A brief example of the differential diagnosis to consider with a suspected febrile seizure is provided in Table 3.

TABLE 2: Red flags indicating increased risk for febrile seizure recurrence.

Red Flags
Family history of febrile seizures
Seizure with low-grade fever
Age under 18 months
Seizure occurring within 1 hour of fever onset
Underlying neurologic disorder

TABLE 3: Abbreviated differential diagnosis to consider with a suspected febrile seizure.

Neonates – Infants:

- Benign Sleep Myoclonus
- Benign Resolved Unexplained Event (BRUE)

All Ages:

- Hypoglycemia
- Trauma
- Infection
- Syncope
- Toxic Ingestion
- Epilepsy
- Panic Disorder
- Psychogenic Nonepileptic Seizure (PNES)

Laboratory investigations

When a child presents with a suspected seizure, it is crucial to assess their blood glucose level to rule out a hypoglycemia-induced seizure. However, in most cases, further laboratory testing is not necessary after a suspected febrile seizure. Febrile seizures have not been linked to electrolyte or biochemical abnormalities.[22] Additionally, white blood cell counts, and other inflammatory markers are often elevated following a seizure, which limits their usefulness in evaluating a potential infectious cause.[23] The workup should be tailored to the individual patient, based on their specific signs, symptoms, and any possible comorbidities.

Neuroimaging

Use of neurologic imaging is variable, but it is generally not recommended after a simple febrile seizure, provided the child returns to baseline without any concerning factors.[22] Similarly, neuroimaging is typically not needed following a

complex febrile seizure, as it has not been shown to offer additional benefits.[24] Neuroimaging may be considered in certain situations, such as in development of focal neurologic deficits, presence of an underlying neurologic disorder, suspicion of afebrile triggers, or concerns about alternative diagnoses. This again highlights the importance of tailoring clinical management to an individual patient's presentation.

Electroencephalography

Electroencephalography (EEG) is not typically recommended in acute workup of a febrile seizure.[24] EEG may be used to assess risk of future afebrile seizures if a child develops focal neurologic changes, experiences recurrent febrile seizures, has a family history of seizures, or has underlying neurologic disorders.[25] EEG does not play a role in determining overall patient disposition.[26]

Lumbar puncture

Bacterial meningitis manifests clinically as seizure in 25% of cases, suggesting that lumbar puncture may be indicated following febrile seizure.[27] However, lumbar puncture is generally not recommended after a simple febrile seizure.[19] The need for a lumbar puncture following a complex febrile seizure may vary depending on the provider, and there are no established guidelines on this.[28] Lumbar puncture is recommended following febrile status epilepticus.[6,24] Additionally, children showing signs of meningitis should receive a lumbar puncture after a febrile seizure, regardless of seizure severity.[17]

Disposition

The disposition of a child following a febrile seizure largely depends on the nature of the seizure, the child's clinical condition, and any underlying concerns identified during evaluation. While a majority of febrile seizures are benign and self-limiting, allowing for safe discharge home, there are instances where admission and further inpatient management are necessary.[6] There is no minimum recommended observation period following a simple febrile seizure, nor is identifying a specific infectious cause required before discharge.[29] It should be ensured that the child has returned to their baseline mental status, they can tolerate oral intake, and that the family is comfortable with discharge. It is important for physicians to counsel the child's parents, address their questions, and discuss the child's long-term prognosis following the febrile seizure. Admission for further workup is warranted if the child does not return to baseline, has developed focal neurologic deficits, is undergoing meningitis workup, has comorbid neurologic pathology, or in those who experienced febrile status epilepticus.[19,17]

Prognosis

Parents often worry about long-term effects of febrile seizures. Research focuses on risk of recurrence, epilepsy risk, and neurologic outcomes. Children who experience one febrile seizure are more likely to have another.[17] Risk factors for recurrence can be referenced in Table 2. Risk of developing epilepsy rises by only 1%-2% after a simple febrile seizure, which is higher than the general population but not clinically significant. Complex febrile seizures carry a greater risk.[16,30] Importantly, simple febrile seizures are not associated with negative behavioral or academic effects. Prognosis for febrile seizures is highly favorable, despite how scary the event may be for caregivers and parents. Education on how to identify a febrile seizure, symptom management, and prognosis is essential.[30] From an osteopathic perspective, further research on the emotional and economic impact of febrile seizures would provide valuable insight to help clinicians better address the psychosocial effects on families.

Prevention

Medications with antipyretic properties, like acetaminophen and ibuprofen, are effective for reducing fever and improving symptoms, but they do not help in preventing initial or recurrent febrile seizures.[16] Prophylactic antiepileptic medications have been studied to reduce febrile seizures, but their potential benefits are often limited by the specific adverse effects of each agent.[31] Agents like phenobarbital or valproic acid, given on a daily basis, have been shown to reduce recurrence of simple febrile seizures. However, both medications carry risks of adverse effects, such as drowsiness, mood changes, and gastrointestinal impacts. Specifically, valproic acid is associated with hepatotoxicity and blood cell dyscrasias, while phenobarbital carries a risk of medication dependence and withdrawal.[32,33] Oral diazepam, when given at the onset of fever, has been shown to be effective in reducing recurrent simple febrile seizures, although it carries the risk of drowsiness and mood changes.[25,34] Due to limited benefits and potential risk of adverse effects, the American Academy of Pediatrics recommends against long-term use of antiepileptic medications for prevention of febrile seizures.[34]

CONCLUSION

Febrile seizures are common age-dependent occurrences that can be distressing, often prompting parents to seek urgent medical evaluation. While most cases resolve spontaneously without need for acute intervention and do not cause long-term deficits, these events can still raise concerns about a child's health. Despite their typically benign nature, there is some variability in managing febrile seizures, particularly regarding use of neuroimaging, prophylactic antiepileptic medications, and standardized discharge criteria. It is crucial for healthcare providers to adhere to the latest guidelines and recommendations to minimize variability in clinical management.

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REVIEW ARTICLE

An Osteopathic Perspective on the Mastitis Spectrum

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KEYWORDS

Osteopathic manipulative treatment

Mastitis

Lymphatic

Myofascial release

Obstetrics

ABSTRACT

Mastitis spectrum disorders include a variety of presentations, including engorgement, plugged ducts, mastitis, and abscess formation. Lactational mastitis is a common occurrence in lactation, affecting up to 10% of patients. Common risk factors include oversupply, nipple trauma, and ineffective latch. Standard treatment includes continued breastfeeding with correction of latch techniques and supportive pain relief. Antibiotics are commonly used but indicated only in infectious presentations to prevent breast abscess formation.

OMT is a physiologically grounded adjunct in the management of mastitis spectrum disorders. Techniques such as myofascial release and lymphatic pumps can enhance lymphatic flow, reduce edema and swelling, and relieve pain. Early case-level evidence suggests that OMT is beneficial when integrated with standard care.

INTRODUCTION

Mastitis spectrum disorders encompass a range of inflammatory breast disorders, including engorgement, plugged ducts, infectious and noninfectious mastitis and progression to abscess formation or rare granulomatous mastitis.[1] Subclinical mastitis is defined by elevated milk somatic cell counts and altered sodium/potassium ratios without overt symptoms, representing a milder immunologically distinct entity within the spectrum. Nonlactational forms, such as idiopathic granulomatous mastitis and tuberculous mastitis, are rare but clinically relevant. The American College of Obstetricians and Gynecologists (ACOG) defines mastitis as localized painful inflammation of the breast, often with systemic symptoms, and notes it is one of the most common complications of breastfeeding.[2]

Prevalence estimates suggest that up to 10% of lactating women in the United States experience mastitis, with higher rates globally and the greatest incidence in the first month postpartum.[3,4] Subclinical mastitis may affect up to 25% of breastfeeding women in some studies. Risk factors include oversupply, nipple injury, latch difficulties, and skipped feedings.[3] Mastitis is a leading cause of premature weaning due to pain and concerns about infection, highlighting the importance of effective management.

Current literature supports conservative management as first-line therapy for mastitis, including continued breastfeeding, ice, and nonsteroidal anti-inflammatory drugs (NSAIDs) for reducing inflammation and edema, analgesia with acetaminophen/paracetamol, and optimization of latch technique.[2,5,6] Antibiotics are reserved for cases with persistent symptoms or evidence of infection, with penicillinase-resistant agents such as dicloxacillin or cephalexin recommended by ACOG.[2] Aggressive breast massage and excessive pumping are discouraged, due to risk of tissue trauma and exacerbation of inflammation.6 (See Academy of Breastfeeding Medicine [ABM] Clinical Protocol #36 for further recommendations.)

The role of OMT and manual therapies in mastitis is an area of growing interest but remains underinvestigated. Systematic reviews and case series suggest that gentle anatomically informed manual therapy may reduce acute breast pain and improve symptoms of engorgement, plugged ducts, and mastitis.[7-10] Techniques that respect the fascial architecture, vascular supply, and lymphatic drainage pathways of the breast are considered safe when performed appropriately.

OMT for Mastitis

Functional anatomy provides the basis for OMT. The breast is a complex structure composed of layered fascial compartments situated anterior to ribs 2-6, with

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The authors have no relevant financial relationships or conflicts of interest to disclose.

lateral extension into the axilla.[11] It is enclosed within a fascial "pocket" formed by the superficial fascia, which includes both superficial and deep layers that surround the breast parenchyma both anteriorly and posteriorly.[12] This fascial envelope creates distinct compartments of adipose— superficial and deeper layer—both traversed by retinacula cutis (Cooper's ligaments).[13] The breast attaches to the chest wall primarily through an "anchoring ring," or circummammary ligament, at its periphery where the superficial fascia blends with the deep fascia. A horizontal septum arises from the pectoral fascia along the fifth rib and extends toward the nipple, serving as a conduit for the primary blood supply and innervation to the nipple-areola complex.[12] Arterial supply is derived predominantly from the internal thoracic artery, with additional contributions from the lateral thoracic and anterior intercostal arteries.[14] The glandular tissue is organized into lobes, each containing a central duct and peripheral branches ending in terminal ductal lobular units (TDLUs), which exhibit consistent three-dimensional architecture.[15]

FIGURE 1: Structure of the female breast.[21]

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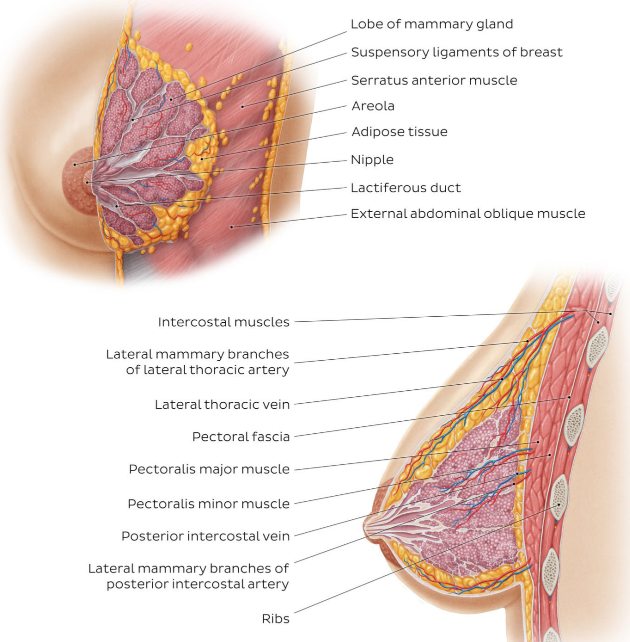

FIGURE 2: Lymphatic drainage of the breast.[22]

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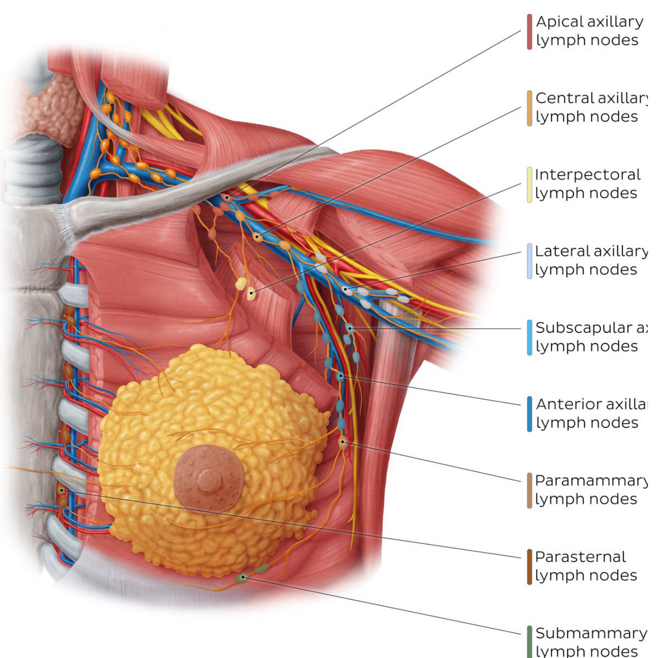

Approximately 75% of breast lymphatic drainage occurs via the axillary nodes, with the remainder directed toward the internal mammary nodes.[14,16] Systemic edema and lymphatic congestion associated with pregnancy profoundly affect the breasts, in part because it is one of the few body regions lacking an intrinsic lymphatic pump.[17] Unlike the extremities or diaphragm, routine movement does not effectively facilitate lymphatic or venous return from the breast, rendering it particularly susceptible to fluid stasis and dysfunction. Understanding these anatomic and physiologic features highlights the rationale for OMT techniques aimed at optimizing fascial mobility, lymphatic drainage, and vascular flow within the breast.

OMT techniques relevant to mastitis include gentle myofascial release, lymphatic pump techniques, and targeted soft tissue mobilization. Myofascial release addresses fascial restrictions and may improve tissue mobility and lymphatic drainage of the breast. Lymphatic pump techniques, such as thoracic and pedal pumps, are designed to enhance lymph flow and reduce stasis, which is particularly important given the breast's lack of inherent lymphatic pump.[17] Soft-tissue mobilization over the chest wall and axilla can facilitate vascular and lymphatic return, while avoiding aggressive massage that may worsen inflammation.[6,18]

Physiologic effects of OMT and manual therapy are increasingly supported by mechanistic studies. OMT has been shown to induce rapid changes in circulating cytokines (interleukin [IL]-8, monocyte chemoattractant protein-1 [MCP-1], granulocyte colony-stimulating factor [G-CSF]) and mobilize dendritic cells, suggesting immunomodulatory effects.[19] Manual therapy may also evoke neurophysiologic, neurovascular, and biomechanical responses, including modulation of pain pathways, reduction of local edema, and improved tissue perfusion. These effects are hypothesized to contribute to symptom relief and improved breast function in mastitis spectrum disorders.

Recent clinical reports provide further context for the application of manual therapy and OMT in mastitis spectrum disorders. Jackson and Loveless describe a

single case of recurrent mastitis managed with targeted OMT, emphasizing anatomic precision and gentle fascial and lymphatic techniques.[8] Their protocol resulted in symptom resolution and prevention of recurrence. Engel et al. presented a case series (n=11) using the Breast Inflammatory Symptom Severity Index, demonstrating that individualized manual therapy was associated with improvement in pain, erythema, and functional scores.[7] No adverse events to treatment were reported. These findings support the utility of OMT as an adjunct to standard care, though evidence remains limited.

In summary, OMT for mastitis spectrum disorders should be anatomically precise, targeting fascial, vascular, lymphatic, and neural structures. Techniques should be gentle and tailored to the individual, with the goal of improving lymphatic and vascular flow to reduce inflammation and support continued breastfeeding. While preliminary evidence and mechanistic studies are promising, robust randomized controlled trials are needed to establish efficacy and safety in mastitis and related breast disorders.[20]

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REVIEW ARTICLE

Preoperative Optimization in Surgical Patients

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KEYWORDS

Multidisciplinary collaboration

Psychological preparation

Postoperative complications

Nutritional optimization

ABSTRACT

Preoperative optimization is a critical component in enhancing surgical outcomes and reducing postoperative complications. This review provides a comprehensive approach to managing preoperative care in a primary care setting, emphasizing the importance of risk assessment, patient education, and multidisciplinary collaboration. By focusing on evidence-based strategies such as structured exercise programs, nutritional optimization, glycemic control, and lifestyle modifications, primary care physicians can significantly improve patient

INTRODUCTION

Preoperative optimization is a critical component of modern surgical planning, designed to improve patient outcomes by addressing modifiable risk factors before surgery. By identifying and managing comorbidities, optimizing physiologic reserve, and preparing patients holistically for the stress of surgery, clinicians can reduce complications, shorten hospital stays, and improve recovery trajectories.[1,2] This approach emphasizes a proactive patient-centered model of care that is especially relevant to osteopathic family physicians, who are trained to consider the interconnectedness of body systems, lifestyle, and environment in patient health by applying a multidisciplinary approach.

DEFINITION AND SCOPE

Preoperative optimization involves a systematic evaluation of a patient's current medical conditions, comorbidities, and therapies, with the goal of reducing perioperative complications.[2] Its scope extends beyond routine preanesthesia evaluations, encompassing surgical complexity, anesthesia type, patient-specific characteristics (e.g., age, sex, frailty), and socioeconomic factors such as access to resources and social support.[2,3] The goal is to identify each risk factor and create an individualized plan to minimize its impact on the recovery process. Interventions may include lifestyle modifications such as smoking cessation, structured exercise programs to improve physiologic reserve, or management of conditions like anemia or diabetes.[2] Identify risk factors and create an individualized plan to minimize their impact on recovery. Interventions may include lifestyle modifications, nutrition, exercise, glucose management, cardiac management, psychological factors, and patient education, among others. Preoperative optimization is vital because it reduces complications, strengthens recovery, shortens hospital stays, lowers costs, and improves overall patient quality of life.

In practice, preoperative optimization is often initiated through a preanesthesia assessment clinic, where anesthesia providers review the surgical plan and evaluate cardiopulmonary risk factors.[2] Traditional preoperative clinics primarily focus on cardiopulmonary risk stratification, but their scope can be limited. In such settings, broader risk factor management, such as nutritional support, smoking cessation, or psychosocial interventions, is often deferred to the primary care provider.[3] By contrast, comprehensive optimization clinics provide individualized multidisciplinary plans that address the full spectrum of risk factors. These may include exercise and nutrition

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The authors have no relevant financial relationships or conflicts of interest to disclose.

interventions, glycemic and cardiovascular management, and behavioral modifications such as alcohol and tobacco cessation. Patients may also be referred to specialists such as nutritionists, physical therapists, and internists, ensuring a coordinated whole-patient approach to surgical readiness.[3,4] Osteopathic family physicians serve as a valuable resource for preoperative optimization, providing a comprehensive review and plan tailored to each patient. Follow-up after surgery ensures that interventions begun preoperatively continue into the recovery phase. A noted limitation of both models, however, is that management of risk factors outside the surgical scope often falls to the patient's primary care provider, and multiple follow-up appointments may extend the timeline before surgery.[2]

IMPORTANCE OF PREOPERATIVE OPTIMIZATION

Preoperative optimization is essential because it reduces surgical risk, enhances recovery, and improves long-term health outcomes. Addressing modifiable risk factors before surgery decreases the incidence of complications such as infection, delayed wound healing, respiratory failure, and cardiovascular events.[5] Patients who undergo structured optimization demonstrate improved resilience, shorter hospital stays, and lower readmission rates.[5,6]

Equally important, preoperative optimization aligns with a patient-centered preventive care model. It empowers patients through education, lifestyle interventions, and active participation in their own recovery. This not only improves surgical outcomes but also promotes long-term health behaviors that extend beyond the perioperative period.[6,7]

From a systems perspective, effective preoperative optimization lowers healthcare costs by reducing postoperative morbidity, minimizing intensive-care utilization, and preventing avoidable readmissions.[7] It also fosters multidisciplinary collaboration among surgeons, anesthesiologists, family physicians, nutritionists, physical therapists, and other specialists—ensuring coordinated care tailored to the individual patient.

EVIDENCE-BASED STRATEGIES FOR PREOPERATIVE OPTIMIZATION

Structured preoperative exercise (prehabilitation) significantly enhances physiologic reserve and surgical outcomes. A systematic review of 186 randomized trials found that targeted exercise prehabilitation reduced postoperative complications by nearly 50% compared to usual care.[1] Aerobic conditioning improves cardiovascular and pulmonary function, while resistance training increases muscle strength and independence.

TABLE 1: Preoperative Optimization Timeline.

Domain	Several Months Available	Only a Few Weeks Available
Initial assessment	Full H and P, labs (CBC, electrolytes, albumin), ECG (if indicated), ASA/RCRI risk calculators. Referrals to specialists (cardiology, pulmonology, endocrinology, geriatrics).[16-21]	Immediate comprehensive assessment (labs, ECG if indicated, ASA/RCRI). Triage for urgent specialist input only if it will change perioperative management.[16-21]
Lifestyle (smoking and alcohol)	≥4 weeks of smoking cessation halves complication risk. Alcohol reduction/cessation improves immune and hepatic function.[10]	Even 2 weeks of abstinence lowers risk—initiate immediately. Provide nicotine replacement and withdrawal management.[9]
Nutrition	Formal dietitian referral. High-protein intake (1.2-1.5 g/kg/d), micronutrient support (vitamin A, C, zinc). Long-term weight management if BMI >30-35.[4,5]	Rapid protein supplementation (oral nutrition shakes), micronutrient boost. Screen with MUST/PG-SGA and correct deficits quickly.[4]
Exercise/ "prehabilitation"	Structured aerobic (3-5x/wk) + resistance (2-3x/wk). Improves VO_2max, functional reserve, and independence.[1,3]	Short daily aerobic exercise (walking, cycling) and light resistance training. Even 2 weeks improves outcomes in frail/high-risk patients.[1]
Glycemic optimization	Goal A1C <8% over weeks. Adjust oral medications, insulin regimens.[6,7]	Perioperative target 100-180 mg/dL. Hold metformin DOS, stop SGLT2i 3-4 days prior. Simplify regimen to basal/bolus insulin if needed.[6-8]
Cardiac/HTN management	Optimize BP <140/90. Continue β-blockers, most antihypertensives. Stop ACE/ARB the morning of surgery. Start β-blockers if indicated (≥1 month before).[11,12]	Continue β-blockers and most antihypertensives. Hold ACE/ARB on DOS. Avoid new cardiac meds unless urgent[12]
Anticoagulation	Plan bridging strategies with specialists. Tailor to the surgery type and patient risk.[11,12,16]	Stop DOAC 1-2 days before (low- vs high-risk procedure). Restart 1-2 days postoperative if safe. Warfarin bridging only if absolutely indicated.[11,12,16]
Psychological prep	Counseling, CBT, structured stress-reduction programs. Build resilience and coping skills.[32-34]	Focused anxiety reduction: brief counseling, relaxation, breathing techniques.[32-34]
Patient education	Multiple touchpoints: expectations for recovery, pain control, nutrition, mobility. Shared decision-making is emphasized.[22-25]	One focused session: surgery risks, NPO instructions, postoperative expectations, and discharge planning.[22-25]
Final week	Reassess nutrition/albumin, functional capacity. Review medication adjustments. Begin carbohydrate-loading plan.[5-8]	Stop SGLT2i 3-4 days prior. Hold metformin and ACE/ARB DOS. Carbohydrate loading if appropriate. Confirm logistics.[5-8]
Day of surgery	Continue β-blockers, most antihypertensives. Glucose monitoring. Confirm smoking/alcohol abstinence.[6-8,11,12]	Same—focus on medication reconciliation, glucose control, and perioperative monitoring.[6-8,11,12]

ACE, angiotensin-converting enzyme; ARB, angiotensin II receptor blocker; ASA, American Society of Anesthesiologists; BP, blood pressure; RCRI, Revised Cardiac Risk Index; BMI, body mass index; CBC, complete blood count; CBT, cognitive behavioral therapy; DOAC, direct-acting oral anticoagulant; DOS, day of surgery; ECG, electrocardiogram; HTN, hypertension; MUST, Malnutrition Universal Screening Tool; PG-SGA, Patient-Generated Subjective Global Assessment; SGLT2i, sodium-glucose cotransporter 2 inhibitor; VO_{2max}, maximum rate of oxygen the body uses during intense exercise

High-risk patients, such as older adults or low baseline fitness, benefit most from a tailored regimen combining moderate-intensity aerobic exercise (walking or cycling 3-5 times weekly) with progressive resistance training (2-3 times weekly).[1,3] Clinically, positive outcomes include fewer postoperative complications, shorter hospital stays, and improved functional recovery, measurable by tests such as the six-minute walk test and sit-to-stand performance.

Nutritional optimization plays a central role in recovery, influencing wound healing, infection rates, and postoperative resilience. Adequate protein intake (1.2-1.5 g/kg/d) initiated at least 1-2 weeks preoperatively preserves lean mass, enhances strength, and reduces complications by up to 30%.[4] Supplementation with vitamins A, C, and zinc promotes collagen synthesis and immunity, thereby accelerating wound healing and reducing surgical-site infections. Carbohydrate loading (45-50 g complex carbohydrates, 2-3 hours before induction) mitigates insulin resistance, perioperative nausea and thirst, and shortens hospital stay.[5] Screening tools such as MUST or PG-SGA identify malnutrition, while weight-management programs in obese patients improve metabolic profiles and lower perioperative morbidity.[5] Evidence shows nutritional optimization leads to faster wound healing, fewer infections, preserved muscle mass, improved functional/nutritional status, shorter hospital stays, and fewer readmissions.

Glycemic optimization targets A_{1C} below 8% to reduce the risks of infection, impaired wound healing, and prolonged hospitalization. Evidence shows that chronic hyperglycemia impairs neutrophil function and collagen synthesis, while perioperative glucose levels above 180 mg/dL significantly increase infection rates.[6-8] Management strategies include: holding metformin on the day of surgery to prevent lactic acidosis, discontinuing SGLT2is 3-4 days preoperatively to avoid ketoacidosis, and adjusting long-acting insulin to 75%-80% of the usual dose. Intraoperative and postoperative glucose levels are best managed with basal-bolus insulin regimens, monitored every 2-4 hours, while sliding-scale insulin alone is discouraged. Measured benefits include lower surgical-site infection rates, improved wound healing, shorter hospital stays, and reduced readmission for hyperglycemia-related complications.

Smoking cessation initiated 3-4 weeks before surgery halves postoperative complication rates, reducing overall complication rates from 41%-21%.[9] Smoking cessation improves pulmonary function, tissue oxygenation, and wound-healing capacity. Similarly, preoperative alcohol reduction reverses impairments in immune response, coagulation, and liver metabolism, lowering the risk of infections and bleeding complications.[10] Outcomes include fewer cardiopulmonary complications, improved wound healing, reduced infection rates, and shorter hospital stays, often measured through complication incidence and pulmonary function tests.

Medication optimization, including anticoagulation and cardiovascular drugs, ensures perioperative safety. A balance of bleeding and thromboembolic risks guides anticoagulation management. For patients on DOACs, medications are stopped 1 day before and restarted 1 day after low- to moderate-risk procedures, and 2 days before and after high-risk procedures, per American College of Cariology (ACC) guidelines.[11,12] Most antihypertensive agents are continued until the day of surgery, except for ACE inhibitors and ARBs, which are withheld the morning of surgery to minimize intraoperative hypotension. β-blockers are continued perioperatively to reduce cardiac events, consistent with American Heart Association (AHA) guidelines.[12] Outcomes include reduced intraoperative hypotension, fewer bleeding complications, decreased perioperative cardiac events, and improved overall safety during the perioperative period.

OMT has the potential to optimize preoperative resilience further. In the evolving landscape of multimodal surgical care, such as Enhanced Recovery After Surgery (ERAS) protocols, OMT has emerged as an integrative adjunct worth consideration. A 2018 summative review of OMT use in surgical care found limited but meaningful evidence across abdominal, thoracic, gynecologic, and orthopedic surgeries, with measured outcomes including postoperative pain, analgesic use, length of stay (LOS), and range of motion.[13] Though only 10 studies were identified, they revealed a mixed profile, some demonstrating benefits while others did not, reflecting considerable heterogeneity in the surgical context, OMT technique, provider experience, and timing.[13] The OMT techniques used within the studies were high-velocity, low-amplitude (HVLA), myofascial release, muscle energy, rib raising, strain/counterstrain, lymphatic techniques, occipito-atlantal decompression, etc. Notable findings included reduced pain, decreased opioid consumption, shorter hospitalization, and improved mobility in some instances, though generalizability remains limited by variability in study design. As manual therapies, such as OMT, gain traction within integrative surgical frameworks, further robust controlled studies are urgently needed to clarify their role in preoperative preparation and postoperative recovery.

RELATIONSHIP BETWEEN PREOPERATIVE CONDITIONS AND POSTOPERATIVE OUTCOMES

Medical optimization during the preoperative period is essential to reducing postoperative complications and improving recovery. Patient factors such as age, BMI, serum albumin levels, tobacco use, and insulin-dependent diabetes mellitus have all been shown to significantly influence outcomes.[14] For example, in patients undergoing total knee arthroplasty, those with a BMI greater than 40

kg/m², hypoalbuminemia (<3.5 g/dL), active tobacco use, and insulin-dependent diabetes demonstrated higher rates of infection, readmission, and overall complications compared to optimized patients.[14] These complications ranged from wound infections and pneumonia to thromboembolic events, cardiac complications, and even mortality.[14] Importantly, patients who were not medically optimized experienced infection, readmission, and complication rates that were 0.7%, 1.6%, and 1.3% higher, respectively, than their optimized counterparts.[14]

Among these risk factors, nutritional status is one of the most influential. Poor nutrition is associated with a 3.7-fold increase in postoperative infection and a 7.2-fold increase in 30-day mortality.[14] Similarly, in surgical patients with head and neck cancer, higher preoperative albumin levels, a marker of nutritional health, were correlated with fewer complications and better recovery.[15] These findings underscore the critical role of holistic preoperative optimization, particularly in nutrition, to reduce complications and promote resilience. For osteopathic family physicians, who emphasize preventive whole-patient care, early identification and management of these modifiable risk factors represents a powerful opportunity to improve surgical outcomes while supporting long-term health.

PREOPERATIVE SCREENING AND RISK ASSESSMENT

Comprehensive preoperative screening is essential for optimizing patient outcomes and reducing perioperative risk. For osteopathic family physicians, this evaluation represents not only a medical assessment but also an opportunity to understand the patient holistically, considering comorbidities, functional capacity, and psychosocial supports that may influence recovery.

TABLE 2: Domains optimized and expected outcomes.

Domain Optimized	Improved Outcomes (Evidence-Based)
Smoking cessation (≥4 weeks)	↓ Postoperative pulmonary complications, ↓ wound infection rates, improved oxygenation, ↓ ICU admissions.[9]
Alcohol reduction (≥4 weeks)	↓ Wound complications, ↓ cardiopulmonary complications, improved immune function, ↓ postoperative delirium.[10]
Nutrition optimization	↓ Surgical-site infection, ↓ anastomotic leak rates, shorter LOS, improved wound healing.[4,5,15]
Prehabilitation (exercise training)	↑Functional recovery, ↑ VO_2max, and mobility, ↓ postoperative complications, and faster return to independence.[1,3]
Glycemic control	↓ Surgical site infections, ↓ cardiovascular complications, ↓ risk of delayed wound healing.[6-8]
Anemia correction (iron, EPO, transfusion planning)	↓ Perioperative transfusions, ↓ infections, improved wound healing, ↓ mortality[14]
Cardiac optimization (β-blockers, HTN control)	↓ Myocardial infarction, ↓ arrhythmias, ↓ cardiac-related morbidity/mortality.[12]
Anticoagulation/antiplatelet planning	↓ Perioperative bleeding, ↓ thromboembolic events, and safer surgical hemostasis.[11,12]
Psychological preparation (counseling, CBT)	↓ Anxiety, ↓ postoperative pain scores, ↓ opioid use, ↑ patient satisfaction.[32-34]
Patient education and shared decision-making	↑ Adherence to perioperative instructions, ↓ unplanned readmissions, ↑ satisfaction, and smoother discharge.[22-25]
ERAS-style multimodal approach	↓ LOS, ↓ complications, ↓ readmission, and faster return to baseline function.[3]

EPO, erythropoietin

Standard preoperative testing may include laboratory studies (CBC, electrolytes), imaging (such as chest radiographs), and ECGs. However, both the ASA and ACC/AHA recommend ordering these studies selectively, based on patient characteristics and surgical risk, rather than indiscriminately.[12,16] For example, ECGs are indicated for patients with known cardiovascular disease or undergoing high-risk surgery, but not for asymptomatic patients undergoing low-risk procedures.[12]

Risk assessment also involves identifying modifiable conditions that, if addressed, improve surgical outcomes. Preanesthetic evaluations highlight chronic conditions such as diabetes, HTN, and chronic obstructive pulmonary disease (COPD), as well as medication reconciliation to minimize drug-related risks.[17] Lifestyle factors, including smoking and poor nutrition, remain critical targets for intervention, with evidence showing that cessation and nutritional optimization reduce complications and support recovery.[18]

Validated risk stratification tools strengthen this process. The ASA physical status classification and RCRI are widely used, with the RCRI effectively stratifying patients into low (<1%) or high (≥1%) risk for major adverse cardiovascular events.[19] Specialty calculators, such as the STS Predicted Risk of Mortality or EUROSCORE II, are particularly valuable for cardiac or high-risk surgical populations.[20] Additionally, the American Geriatrics Society supports comprehensive geriatric assessments, which tailor preoperative plans to the needs of older adults, improving recovery and reducing complications.[21]

Notably, patients with significant comorbidities, such as obesity, smoking, diabetes, or COPD, are flagged as higher risk and may benefit from targeted interventions such as intensive prehabilitation or specialist consultations.[18,21] By integrating these tools and assessments, osteopathic

family physicians can proactively identify vulnerabilities and design individualized optimization strategies that reduce complications, support surgical recovery, and enhance long-term health.

ROLE OF PATIENT EDUCATION IN PREOPERATIVE OPTIMIZATION

Education on Surgical Risks and Expectations

Preoperative education is a cornerstone of surgical preparation, ensuring patients are well informed, engaged, and empowered to participate in their care. From an osteopathic perspective, this process extends beyond simply listing risks; it is about addressing the patient as a whole, medically, emotionally, and socially, to optimize outcomes and recovery. Research shows that comprehensive preoperative education improves the informed consent process by enhancing patient understanding of potential complications and empowering shared decision-making.[22] Tailoring education to an individual's health status and personal risk factors not only strengthens comprehension but also reduces preoperative anxiety and promotes adherence to medical recommendations.[23] By clarifying expectations, physicians can help patients approach surgery with greater confidence and preparedness.

Equally important, education provides patients with a realistic framework for postoperative recovery. Structured preoperative programs, such as those studied in colorectal cancer populations, have been shown to improve coping strategies, reduce stress, and enhance adherence to recovery protocols.[24] Similarly, patients undergoing abdominal surgery who received detailed education demonstrated better outcomes, including lower anxiety, improved satisfaction, and fewer postoperative complications.[25] Practical discussions about anticipated pain levels, activity restrictions, and common recovery milestones help bridge the gap between expectation and reality, which reduces risk of dissatisfaction or unnecessary readmissions.

For osteopathic family physicians, preoperative education presents an opportunity to practice whole-person care, acknowledging the patient's physical, mental, and social dimensions. By investing time in discussing risks, expectations, and recovery pathways, physicians not only support safer surgeries but also cultivate trust, resilience, and active patient participation in their own healing.

PREOPERATIVE LIFESTYLE MODIFICATIONS

Lifestyle modifications in the preoperative period are powerful evidence-based strategies that directly influence surgical outcomes. For osteopathic family physicians, this stage of care provides a unique opportunity to guide patients toward healthier behaviors that not only reduce perioperative risks but also promote long-term wellness. Patient education is central to this process, empowering individuals to make informed decisions that enhance their surgical recovery and overall health.

Smoking cessation is one of the most impactful interventions, with studies demonstrating that quitting at least several weeks before surgery reduces pulmonary complications and wound infections.[26,27] Similarly, preoperative alcohol reduction improves immune function, hemostasis, and metabolism, lowering the likelihood of postoperative complications.[28] Importantly, recommendations for behavioral change should be tailored to align with each patient's readiness and preferences, whether focusing on short-term preoperative goals or longer-term health improvements.[28]

Nutritional and hydration counseling further enhances surgical preparedness. Research highlights that targeted dietary education, particularly in populations undergoing complex procedures such as esophageal surgery, optimizes recovery and improves resilience to surgical stress.[29] Adequate hydration and balanced nutrition strengthen immune function, promote wound healing, and reduce hospital LOS, underscoring the value of comprehensive preoperative lifestyle counseling.

By integrating these evidence-based interventions, osteopathic family physicians can address both the physiologic and behavioral dimensions of care. This approach reinforces the osteopathic commitment to preventive medicine, empowering patients to actively participate in their surgical journey while laying a foundation for healthier living beyond the perioperative period.

PSYCHOLOGICAL PREPARATION

Psychological readiness is a critical component of preoperative optimization. Unmanaged anxiety and fear can increase postoperative pain, prolonged hospital stays, and raise complication rates. Structured interventions, such as guided relaxation, mindfulness, and cognitive-behavioral strategies, have been shown to reduce preoperative anxiety and improve patient confidence, helping patients feel more in control and prepared for surgery.[30] Studies further emphasize that unmanaged preoperative anxiety can contribute to increased postoperative pain, prolonged hospital stays, and higher complication rates.[31]

Psychological prehabilitation programs that focus on stress management and resilience-building further support recovery by reducing stress-induced physiologic responses.[32] Integrating these strategies into preoperative

care aligns with the osteopathic principle of whole-person medicine, promoting not only improved surgical outcomes but also enhanced overall patient well-being and quality of life.

PATIENT EMPOWERMENT AND ENGAGEMENT

Patient education plays a pivotal role in preoperative optimization by fostering patient empowerment and engagement, leading to improved surgical outcomes. Encouraging patients to actively participate in their preoperative care, such as managing chronic conditions, adhering to prescribed medications, and engaging in lifestyle modifications, enhances their sense of control and preparedness for surgery.[33] This proactive approach, known as “prehabilitation,” has been shown to improve resilience and recovery, particularly in surgical oncology patients.

Additionally, open communication between patients and healthcare providers is essential for addressing concerns, setting realistic expectations, and ensuring adherence to preoperative guidelines.[34] Research highlights that structured patient engagement strategies, including shared decision-making and personalized education, lead to greater patient satisfaction and reduced perioperative complications.[35] By prioritizing patient empowerment and fostering collaborative communication, healthcare teams can enhance surgical preparedness and optimize postoperative recovery.

MULTIDISCIPLINARY COLLABORATION IN PREOPERATIVE OPTIMIZATION

Multidisciplinary collaboration in preoperative optimization is essential for improving surgical outcomes, particularly in complex and high-risk patients. A team-based approach involving surgeons, anesthesiologists, nutritionists, physiotherapists, and other specialists ensures comprehensive patient evaluation and targeted interventions to optimize perioperative care.[36] Preoperative clinics and case managers play a crucial role in coordinating these efforts, streamlining communication, and ensuring timely implementation of necessary prehabilitation strategies.[37] Additionally, interdisciplinary collaboration has been shown to reduce postoperative complications by addressing modifiable risk factors and enhancing perioperative decision-making.[38] For instance, in complex surgical cases such as spine and cardiac procedures, structured multidisciplinary care has demonstrated improvements in patient outcomes, emphasizing the value of integrated team-driven strategies in surgical optimization.[39]

CONCLUSION

This review provides a comprehensive overview of current evidence-based strategies in preoperative optimization, including risk assessment, targeted interventions, patient education, and multidisciplinary collaboration, all aimed at reducing postoperative complications and promoting recovery. Primary care physicians, particularly in osteopathic family medicine, play a crucial role in implementing these strategies while fostering patient empowerment and engagement to improve surgical outcomes and quality of life. Despite strong evidence supporting many perioperative interventions, further research is needed to evaluate the specific efficacy of preoperative OMT and its integration into holistic preoperative care. Expanding the evidence base for OMT may help optimize surgical preparedness and enhance postoperative recovery in diverse patient populations.

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REVIEW ARTICLE

Multidisciplinary Care Models for Managing Fibromyalgia

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KEYWORDS

Fibromyalgia

Pain management

ABSTRACT

Fibromyalgia (FM) is a prevalent syndrome characterized by widespread chronic pain, fatigue, sleep disturbances, and cognitive difficulties. Diagnosis is primarily clinical, often involving exclusion of other conditions.

Effective management of FM requires a multidisciplinary approach that utilizes a stepwise methodology. Rather than aiming to eliminate disease, the focus should be on improving quality of life, primarily by providing symptomatic relief. Nonpharmacologic treatments, including patient education, exercise (especially aerobic), and cognitive behavior therapy (CBT), are crucial for improving pain and function. Pharmacologic options that are FDA approved for FM include duloxetine, milnacipran, and pregabalin. Amitriptyline, though not FDA approved for FM, has also demonstrated effectiveness in patients with FM. More conventional pain medications commonly prescribed in other chronic conditions, such as opioids and nonsteroidal anti-inflammatory drugs (NSAIDs), are generally not recommended.

An osteopathic medicine approach can enhance the body's self-healing capabilities and improve health in patients with FM. OMT may offer adjunctive benefits by addressing musculoskeletal somatic dysfunctions and normalizing autonomic tone. OMT, such as myofascial release, may be particularly relevant for patients with FM who often have a lower pain threshold. OMT with a patient-centered approach focusing on symptom management and improved quality of life is essential. Utilizing a multidisciplinary approach to FM treatment can allow for long-term improvement in a patient's health and quality of life.

INTRODUCTION

Fibromyalgia (FM) is a syndrome characterized by widespread chronic pain, fatigue, sleep disturbances, and cognitive difficulties. There are several pathophysiologic theories regarding FM. Firstly, FM is likely the result of dysregulated central pain processing.[1] This results in changes in sensitization, manifesting as a lower threshold for pain, allodynia, and hyperalgesia.[2] Brain imaging in several studies has shown that patients with FM had decreased mu-opioid–receptor binding potentials compared to healthy controls and also had an imbalance between excitatory and inhibitory neurotransmitters, particularly within the insula.[2] Another potential etiology involves a disordered autonomic nervous system.[1] Although symptoms differ from person to person, similar patterns have been noted in patients with FM. Common symptoms include, but are not limited to, widespread pain, headaches, and fatigue. Patients can also have increased muscle tone and tenderness, along with sleep disturbances.[2] Like with many other chronic conditions such as irritable bowel syndrome or musculoskeletal pain in which there exist associations with increased inflammatory response or neuropathic involvement, potential involvement of these associations in patients with FM has not been ruled out.[3] As a result of their symptoms, many patients with FM often experience a variety of psychosocial consequences, including depression, increased stress, and decreased quality of life. Treatment is based on patient-directed goals, often ranging from decreasing pain to increasing daily activities. This requires a multimodal approach, targeting several aspects of the condition.

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The authors have no relevant financial relationships or conflicts of interest to disclose.

HISTORY AND PHYSICAL EXAM

The predominant complaint amongst patients with FM is chronic widespread pain coupled with muscle stiffness or tenderness. A systems-based physical examination with attention to musculoskeletal structures demonstrates this. If localized areas of inflammation, gross joint pathologies, or external trauma are observed, alternative diagnosis should be investigated.[1] Common concurrent symptoms include excessive fatigue and sleep disturbances. Altered cognitive function, such as brain fog, difficulty concentrating, and increasing forgetfulness, may also be present.

To distinguish FM from other chronic pain conditions, the Fibromyalgia Rapid Screening Tool (FIRST) was developed in 2010. FIRST consists of six items requiring "yes/no" responses associated with clinical manifestations of FM.[2] Each item is assigned a value of one point per "yes" answer, and a total score of five or more is considered suggestive of FM. In 2016, further modification of this criteria suggested using a generalized pain criterion, which further decreased misclassification of regional pain syndromes.[4] These criteria require that FM patients have pain in four of five body regions, termed multisite pain (MSP), in contrast to the 1990 definition of chronic widespread pain (CWP).[4]

FIGURE 1: Fibromyalgia Rapid Screening Tool (FIRST).

FIBROMYAGLIA RAPID SCREENING TOOL (FIRST)

SYMPTOM		
I have pian all over my body	YES	NO
My pain is accompanied by a continuous and very unpleasant general fattigue	YES	NO
My pain feels like burns, electric shocks, or cramps	YES	NO
My pain is accompanied by other unsusal sensations throughout my body, such as pins and needles, tingling, or numbness	YES	NO
My pain is accompanied by other health problems such as digestive problems, urinary problems, headaches, or restless legs.	YES	NO
My pain has a significant impact on my life, particularly on my sleep and my ability to concentrate, making me feel slower in general	YES	NO
TOTAL*		

*_ONE POINT EACH YES ANSWER. A SCORE OF FIVE OR GREATER SUGGESTS FIBROMYALGIA

TREATMENT

Nonpharmacologic Therapies

Nonpharmacologic treatments are effective for management in fibromyalgia, especially for debility and pain-related psychosocial issues. These treatments aim to improve health-related quality of life and daily functioning rather than seeking a cure.[5] Patient education regarding fibromyalgia diagnosis is a mainstay of treatment.[2] After patients understand their diagnosis, helping them create short- and long-term goals is the next step. Clinicians find it helpful to schedule regular follow-up visits to track progress and make goal adjustments as needed.

Cognitive behavioral therapy (CBT) teaches patients how to address negative thoughts and behaviors, helping to promote coping skills to face the mental burden of chronic pain, fatigue, and poor sleep. Systematic reviews demonstrate moderate-quality evidence that patients treated with CBT experience improvement in pain and disability in both the short and medium term.[6] Acceptance and commitment therapy and operant therapy are subtypes of CBT available for use. With decreasing social stigmas surrounding the role of talk therapy and more diverse delivery methods, CBT continues to be a promising treatment option.[6] Furthermore, support groups and stress management techniques, such as mindfulness, enhance coping and resilience.[7]

Low-impact exercise, including aerobic, endurance training, or a combination, produces improvements in quality of life and reduction in fatigue.[8] The proposed mechanism is related to regulating the autonomic nervous system by decreasing sympathetic activity and promoting parasympathetic activity to relax the musculoskeletal structures.[8] This leads to a reduction in stress levels. A personalized exercise regimen must be created based on the patient's tolerance to physical activity.

Encouraging a healthy anti-inflammatory diet is essential. There are limited studies about specific diets; however, patients have seen benefits with certain diets such as a Mediterranean diet, vegetarian diet, monosodium-glutamate−free, or aspartame-free diet. A personalized diet can be a great complementary lifestyle modification.[8]

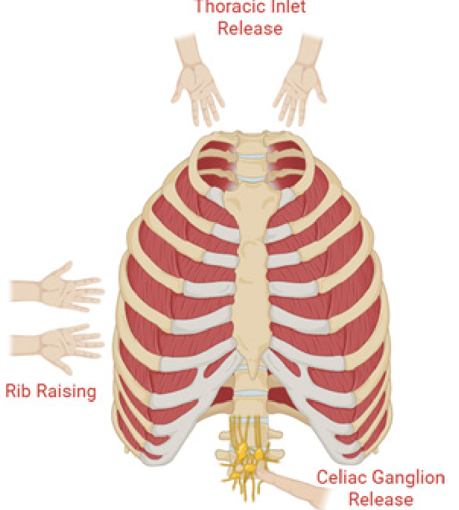
The osteopathic approach to fibromyalgia treatment is another modality with promising results. Using the body's self-healing capabilities can allow the patient to feel symptomatic relief from a holistic standpoint.[9] OMT has a variety of techniques that can serve both a diagnostic and therapeutic role, making them efficient and robust.[9]

A case report from 2025 analyzed the impact of consistent OMT on a patient with fibromyalgia resistant to other therapies such as pharmacologic agents and acupuncture.[10] Using a systems-based approach, osteopathic scanning and screening techniques uncovered multiple somatic dysfunctions and used them as treatment targets. The goal of treatment was to restore biomechanical and neuromuscular balance.[10] Notable techniques performed included rib raising of the thoracic spine, celiac ganglion release, and thoracic inlet myofascial release, highlighting a multimodal approach of addressing lymphatic and musculoskeletal components of somatic

dysfunction. The patient reported immediate reduction of symptoms posttreatment, and after a 6-week treatment course, reported a decreased pain score from 7/10 to 2/10.[10] Utilization of osteopathic principles should be considered in patients with FM, especially those who have experienced symptomatic improvement with previous OMT. By directly addressing somatic dysfunctions across multiple body regions, OMT at regularly-spaced intervals utilizes an integrative therapeutic approach to manage the musculoskeletal, autonomic, and central nervous system components of FM. Given its viability and low-risk profile, OMT merits further investigation through robust studies regarding its role in comprehensive FM care when tailored to somatic findings and patient needs.

Another intervention that can be utilized in patients with FM is acupuncture. This intervention mirrors osteopathic medicine principles, encouraging the self-healing capabilities of the body. Evidence is limited regarding the efficacy due to small sample sizes, heterogeneity in protocols, and potential placebo effect.[11,12] Acupuncture is currently recommended as an adjunct therapy in the European League Against Rheumatism (EULAR) 2016 guidelines, particularly for patients unresponsive to pharmacologic or exercise-based interventions.[13]

FIGURE 2: OMT for FM.



Pharmacologic Therapies

While pharmacologic interventions have been reported to improve pain-related symptoms, health-related quality of life from these agents alone is often minimal. However, drug monotherapy with an FDA-approved agent is still considered first-line treatment for FM.

FDA-approved centrally acting drugs such as pregabalin, duloxetine, and milnacipran are commonly utilized.[14] Pregabalin has been shown to address not only pain-related symptoms but also sleep quality with a low risk of physical dependence, making it a long-term option. Duloxetine is a serotonin-norepinephrine reuptake inhibitor (SNRI) shown to reduce pain and muscle stiffness, with patients expressing benefit coming from reduced fatigue, antidepressive effects, and anxiolytic effects. Milnacipran is another SNRI with similar effects on pain and functionality. Notable is its longer time to diminished therapeutic response (on average, 3 years) compared to duloxetine.[15] Amitriptyline is a non-FDA–approved centrally acting drug also used for the management of FM. Mechanistically, it is thought to involve the activation of descending inhibitory pain pathways that exert effect on the brain.[2,16] Low doses at bedtime are generally recommended upon initiation to reduce daytime fatigue. Other tricyclic agents like nortriptyline may be better tolerated with fewer adverse effects, though fewer studies exist to support their role in the management of FM.[2,17]

Opioid analgesics such as hydrocodone and oxycodone do not have any evidence to suggest that they improve health-related quality of life in FM. Given their side effects of respiratory depression and risk of physical dependence, they are not recommended for routine or prolonged treatment. Nonsteroidal anti-inflammatory drugs (NSAIDs) such as ibuprofen and naproxen have not been shown to have increased efficacy over placebo for FM-specific pain and have risks associated with long-term use, such as gastric ulcers and worsening renal function.[18]

Muscle relaxants such as cyclobenzaprine have been shown to improve quality of sleep in patients with FM.[2] Many patients find relief with this drug alone and do not require analgesic agents. Prescribers must consider its use concurrently with serotonergic agents, as it can increase risk for serotonin syndrome and prolonged QT interval.[19]

Low-dose naltrexone (LDN), an opioid antagonist, has gained increasing relevance as a treatment option for FM. Research suggesting that endogenous opioid levels in FM patients are higher compared to those without the condition has laid the foundation for its use.[20] Anti-inflammatory mechanisms of LDN via antagonizing toll-like receptor 4 and downregulating glial cell activity, further support its potential therapeutic role in amplified pain syndromes.[20] Standard dosages range between 1 and 4 mg.[21]

Recent investigations into the potential of intravenous ketamine in treating pain secondary to FM have shown promising results compared to placebo for not only pain relief but also for physical function and health-related quality of life (HRQoL).[22] Further studies looking at alternative delivery methods of ketamine such as intranasal, sublingual, and intramuscular injections in patients with FM are currently underway.

Growing evidence regarding magnesium has suggested its potentially beneficial role in the management of FM. Studies have demonstrated lower levels of intracellular magnesium in patients with FM compared to placebo.[9] These deficiencies were associated with low-grade inflammation, paresthesias, and muscle weakness.[23]

Neural therapy, which involves injecting local anesthetic such as lidocaine into trigger points of autonomic ganglia, has also been studied in patients with FM. In 2019, a multicenter study compared neural therapy to exercise in patients with FM. Participants receiving neural therapy showed significant improvement in pain, depression, and quality of life.[24] Pain reduction is attributed to lidocaine's impact on modulating central sensitization.[24]

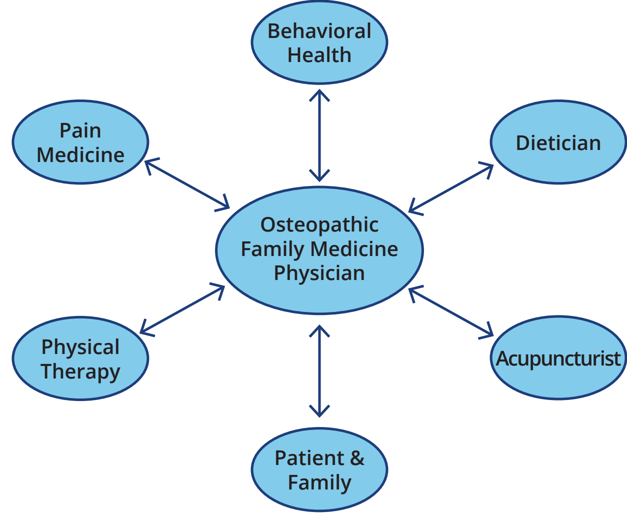
DISCUSSION

FM remains a multifaceted chronic pain condition that affects patients from a wide range of health backgrounds. With more research focused on the biomechanical pathways underlying pain perception, as well as clinical investigations aimed at understanding the symptomatic manifestations of FM, it has become increasingly accepted that a multidisciplinary approach to management maximizes patients' chances of successful symptom alleviation and return to daily function. This approach aims to leverage the unique skill sets across providers from multiple specialties to deliver integrative care with the mutual understanding that the patient's needs will be more comprehensively and effectively addressed.[25] Key tenets of a multidisciplinary model improve healthcare outcomes via increased patient satisfaction, adherence to treatment, and earlier discharges from hospitalizations, while simultaneously decreasing complications, mortality rates, and inpatient admissions.[26]

This model underscores the value of family medicine within the multidisciplinary team. Team members could include a pain medicine provider, behavioral health specialist, physical therapists, dietitians, acupuncturists, and the patient. The family medicine physician serves as the overseer and organizer of these tenets of care, incorporating relevant osteopathic techniques. Additionally, they can set patient-centered goals with patients to ensure that the treatment regimen appropriately addresses their needs. Once the treatment framework has been established, incorporating these more specialized disciplines enables a more effective regimen by leveraging the clinical expertise these specialties provide for specific concerns.

Ultimately, a robust and well-executed multidisciplinary treatment plan gives patients with FM the highest chance for success in leading functionally and emotionally meaningful lives.

FIGURE 3: Multidisciplinary model for FM treatment team.



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CLINICAL IMAGE

Corneal Abrasion With a Twist

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KEYWORDS

Corneal abrasion • Bacterial keratitis

CASE PRESENTATION

Sixty-one-year-old male presents to urgent care for right eye pain that has been worsening over the last 4 days. Patient is now having photophobia and pain with opening his eye, which concerned him. He also states he sees a "big glob" in his visual field. This has never happened to him before. He wears contact lenses but has not slept in them and has not worn them in the last 4 days. He has not had any trauma. He attempted to take Benadryl, Tylenol, and use Visine eyedrops without any relief. He denies any sick contacts but does endorse some subjective fevers and chills. On corneal exam, a staining defect was present with hypopyon in anterior chamber, otherwise clear of other abnormalities.

FIGURE 1: Corneal Infiltrate With Hypopyon

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The authors have no relevant financial relationships or conflicts of interest to disclose.

QUESTION

1. What is the most likely diagnosis in this patient presenting with photophobia, corneal epithelial defect, and hypopyon?

A. Viral conjunctivitis

B. Bacterial keratitis

C. Corneal abrasion

D. Acute angle-closure glaucoma

E. Herpes simplex keratitis

Correct Answer: B. Bacterial keratitis

2. What is the most common pathogen associated with contact lens–related corneal infections?

A. *Staphylococcus aureus*

B. *Streptococcus pneumoniae*

C. *Pseudomonas aeruginosa*

D. *Acute angle-closure glaucoma*

E. *Moraxella catarrhalis*

Correct Answer: C. *Pseudomonas aeruginosa*

3. What is the most appropriate next step in management?

A. Prescribe topical steroids and reassess in 72 hours

B. Reassure and discharge home with artificial tears

C. Emergent ophthalmology referral and start topical antibiotics

D. Initiate systemic steroids

E. Observe in clinic for 24 hours

Correct Answer: C. Emergent ophthalmology referral and start topical antibiotics

Discussion

Corneal abrasions are common ocular injuries encountered in urgent care and primary care settings, often resulting from mechanical trauma, foreign bodies, environmental exposures, or improper contact lens use. These abrasions typically involve a disruption in the corneal epithelium and are characterized by acute onset of eye pain, photophobia, tearing, foreign body sensation, and blurred vision. The presence of a hypopyon, as seen in the image provided, raises concern for a more severe condition, such as bacterial keratitis or endophthalmitis. While most corneal abrasions heal within 24-72 hours, they remain susceptible to secondary infections, particularly in contact lens wearers, who are at heightened risk for Pseudomonas aeruginosa infection due to the bacteria's association with contaminated lenses and lens solutions.[1]

For uncomplicated abrasions, management typically involves use of prophylactic topical antibiotics to reduce risk of secondary infection, especially for contact lens wearers. Fluoroquinolones or aminoglycosides are commonly used to provide broad-spectrum coverage, with particular attention to Pseudomonas. Topical analgesics and cycloplegic agents are also used for symptom relief. However, use of topical anesthetics is generally avoided due to potential for corneal toxicity and delayed healing.[2] The primary goal in treating corneal abrasions is to ensure proper healing while preventing infection, which is essential to avoid long-term visual complications.[1]

When symptoms fail to improve or worsen within 24-48 hours, clinicians must consider bacterial keratitis, a vision-threatening infection characterized by corneal epithelial defects with stromal infiltration. A hypopyon, as seen in this case, is a significant finding indicative of intraocular inflammation and necessitates urgent ophthalmologic evaluation.[3] Pseudomonas aeruginosa is the most common pathogen responsible for contact lens−associated keratitis and is known for its aggressive and rapidly destructive course. Symptoms of bacterial keratitis include increasing pain, photophobia, reduced visual acuity, and development of corneal opacities or infiltrates.[4]

The first line of management for bacterial keratitis involves broad-spectrum topical antibiotics, such as fluoroquinolones, or fortified vancomycin and tobramycin. These antibiotics offer extensive coverage, including Pseudomonas, which is crucial in preventing vision loss. Immediate referral to an ophthalmologist is recommended for further evaluation and management. Topical corticosteroids should be avoided in the initial phase of treatment, as they can exacerbate infection and delay healing.[2]

In addition to immediate management, patient education on proper contact-lens hygiene, such as avoiding extended use, not reusing contact lens solution, and frequent replacement of contact lens cases, is crucial.[2] Proper education and follow-up can significantly reduce risk of recurrent infections and preserve long-term visual outcomes.[3]

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PATIENT EDUCATION HANDOUT

PEDIATRICS

Febrile Seizures

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WHAT IS A FEBRILE SEIZURE?

Febrile seizures are convulsions triggered by a rapid rise in body temperature, usually as a result of an infection.[1] This disrupts brain activity, leading to loss of consciousness, irregular breathing, and jerking movements, which typically last under 5 minutes. Febrile seizures typically happen within a few hours of illness and with a fever above 102°F (39°C), but they can also occur at lower temperatures or before any symptoms appear.[2]

Who Is at Risk?

Febrile seizures affect 2%-5% of children aged 6 months to 5 years, but they most commonly occur between 12 and 18 months.[3] Risk is higher in children with an underlying neurologic disorder or a family history of febrile seizures.[3]

Are They Dangerous?

In most cases, febrile seizures are not harmful and do not lead to neurologic problems or developmental delays.[3]

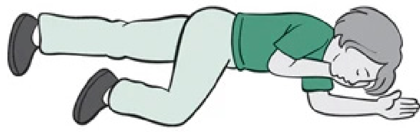
Will My Child Have More Seizures?

Around 30% of children who have a febrile seizure will have another, but this risk decreases as they get older.[3] Children who experience a febrile seizure have a slightly higher risk of developing lifelong seizures, about 1% more than the general population.[4] Although fever-reducing medications like acetaminophen or ibuprofen can help ease the discomfort of a fever, there is no medication to prevent developing a febrile seizure.

What to Do if Your Child Is Having a Febrile Seizure

Although distressing to witness, stay calm and monitor the child to ensure their safety.

FIGURE 1: Recovery position.[6]



- **Protect your child from injury**: Ensure they're in a safe place, like on the floor or in bed, with enough space to move freely without injury.
- **Position your child**: Gently turn your child onto their side into the recovery position (Figure 1). This will allow vomit or saliva to drain and minimize choking.
- **Do not place anything in their mouth**: A common misconception; don't put anything in their mouth or try to hold their tongue, as this can cause harm.
- **Postseizure care**: After the seizure, your child may feel confused or sleepy. Let them rest as they gradually recover.
- **Seek medical care**: Call 911 or go to the nearest emergency department if a seizure lasts more than 5 minutes, or if the child doesn't wake up or return to normal afterward. Be sure to follow up with your pediatrician to discuss the febrile seizure.

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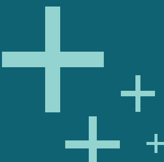

PATIENT EDUCATION HANDOUT

PEDIATRICS

Childhood Asthma Management in Primary Care

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WHAT IS ASTHMA?

Asthma is a lung condition that makes it hard to breathe because the small airways in the lungs get swollen and narrow. Children with asthma may wheeze, cough, have trouble breathing, or say their chest feels tight. Asthma often starts in kids. It can run in families or be caused by things in the environment. Asthma in children can be mild or very serious. Asthma can be very dangerous if it's not treated.

Staying away from things that trigger asthma can keep your child healthy.

- Common indoor triggers: dust, mold, smoke, and pets.[2]
- Common outdoor triggers: trees, grass, weeds, and air pollution.

Doctors often use a test called ***spirometry*** to see if your child has asthma. It shows how much air your child's lungs can hold and how well they can blow air out.[1] It helps doctors see how well your child's lungs are working.[1]

WHAT IS ASTHMA?

The goal of treating asthma is to keep your child safe and healthy. Medicines can help prevent asthma attacks and help your child live a normal life. Doctors treat asthma to help your child have fewer symptoms and keep their lungs healthy. They try not to use strong medicines. They also try to make sure your child's medicines don't cause problems.

Your child's treatment depends on how bad their asthma is.[3] Most children use two types of medicine:

- A quick-relief inhaler: Used when your child can't breathe well.
- A daily medicine: Used every day to stop asthma attacks. It keeps the lungs calm.

What Can I Do at Home?

There are many things you can do at home to help control your child's asthma and keep their lungs healthy.

When Should I Call the Doctor?

If your child has trouble breathing, wheezing, or a cough that doesn't get better after using their inhaler, get help right away.

RESOURCES

Below are trusted resources for parents with more information on asthma.

- American Lung Association: https://www.lung.org/lung-health-diseases/lung-disease-lookup/asthma/managing-asthma/children-and-asthma
- Nationwide Children's Hospital: https://www.nationwidechildrens.org/family-resources-education/health-wellness-and-safety-resources/resources-for-parents-and-kids/asthma-program-resources

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Recognize Excellence in the Profession

2026 AWARDS

The American College of Osteopathic Family Physicians (ACOFP) and the ACOFP Board of Governors recognize the following exceptional members for their contributions to the organization and the osteopathic profession.

OSTEOPATHIC FAMILY PHYSICIAN OF THE YEAR AWARD

The ACOFP Osteopathic Physician of the Year Award honors physicians who have made outstanding contributions to the osteopathic profession and local communities.

Nicole H. Bixler, DO, MBA, FACOFP *dist*.

Dr. Bixler received her Doctor of Osteopathic Medicine degree from the Philadelphia College of Osteopathic Medicine in 2002, and completed her family medicine residency at Frankford Hospitals. She currently serves as the lead physician at Immediate Medcare and Family Doctor of Spring Hill, a value-based care practice in rural Hernando County, Florida, where she cares for geriatric patients in both the outpatient and inpatient settings. She serves as core faculty for the HCA Oak Hill Hospital Family Medicine Residency Program and is a staff physician at Tampa General Hospital's Spring Hill and Brooksville locations. Additionally, she is a Clinical Associate Professor at the Kiran Patel College of Osteopathic Medicine at NOVA Southeastern University, where she serves as a clinical preceptor in Rural and Underserved Family Medicine for 3rd year medical students.

For the past 19 years, Dr. Bixler has remained deeply dedicated to her community and to training the next generation of physicians. She has mentored countless medical students and family medicine residents, modeling empathy, professionalism, and the full breadth of osteopathic primary care. Her mentees frequently credit her with inspiring their confidence, shaping their professional values, and demonstrating what it means to be both an excellent physician and a compassionate leader. Through her mentorship, her influence will continue to extend for decades to come.

Nationally, Dr. Bixler served as President of the American College of Osteopathic Family Physicians from 2020 to 2022, guiding the organization through the challenges of the COVID-19 pandemic while advancing leadership development and inclusion initiatives. She currently serves on the ACOFP Foundation Board, the Executive Conclave of Fellows, Leadership Development Committee, and the ACGME Board of Directors, in addition to many other national and local leadership roles.

A Distinguished Fellow of the ACOFP, Dr. Bixler has received numerous honors, including American Osteopathic Foundation Educator of the Year, the ACOFP Distinguished Service Award, Outstanding Female Leader, Young Physician of the Year, and Physician of the Year from the Florida Society of ACOFP.

Above all, Dr. Bixler is proud to share her journey with her husband, Brian Bixler, MD, and their three daughters, Avery, Ellory, and Lily. As she often says, “Family means everything to me, and I’m so lucky they have been able to be part of my ACOFP leadership journey.”

Dr. Bixler’s steadfast commitment to compassionate care, education, mentorship, and leadership truly embodies the spirit of the ACOFP Physician of the Year Award.

LIFETIME ACHIEVEMENT AWARD

The ACOFP Lifetime Achievement Award honors individuals for career-long service to their patients, osteopathic family medicine, and ACOFP.

Barbara E. Walker, DO, FACOFP, FAAFP

Dr. Walker earned her Doctor of Osteopathy from the College of Osteopathic Medicine of the Pacific (now Western University) in 1984, and completed her residency at Womack Army Community Hospital, Fort Bragg, North Carolina. She currently serves as a consultant to the North Carolina Medical Board.

She has 26 years of Army service, including deployment to Desert Shield/Desert Storm, retiring in 2006 as a colonel (and with the additional title of "Grambo"). She became a Fellow of ACOFP in 2000 and has held academic appointments in family medicine at the University of North Carolina at Chapel Hill, Edward Via College of Osteopathic Medicine–Virginia Campus, and the University of Pikeville–Kentucky College of Osteopathic Medicine. She also serves on the Presidential Advisory Committee at Campbell University and has received honorary degrees from Campbell University and VCOM.

Among her many leadership positions, Dr. Walker served as president of the North Carolina Osteopathic Medical Association and has remained active in NCOMA and NC-ACOFP. She has been a delegate to the AOA House of Delegates since 1989, served on the AOA Board of Trustees, and held numerous national committee roles. In 2013, she became the first female DO appointed to the North Carolina Medical Board and served as its president from 2018 to 2019. She has also served on the Board of the Federation of State Medical Boards, led the American Association of Osteopathic Examiners, and currently serves on the National Board of Osteopathic Medical Examiners. She has represented the FSMB on the National Academy of Medicine Action Collaborative on Combating Substance Use and the Opioid Crisis for the past three years.

Dr. Walker's past honors include the AOA Great Pioneer in Osteopathic Medicine designation, the NBME Clark Award for Patient Advocacy, the ACOFP Outstanding Female Leader Award, and multiple state and national service awards.

She and her husband, also a retired Army colonel, have five children, five grandchildren, and four great-grandchildren.

DIVERSITY, EQUITY, AND INCLUSION AWARD

The ACOFP Diversity, Equity, and Inclusion Award (DEI) recognizes osteopathic family physicians who make significant contributions toward enhancing DEI within the profession, honoring those who have demonstrated behaviors or led initiatives that foster these principles within diverse and underrepresented communities.

Jessica M. McColley, DO

Dr. McColley received her Doctor of Osteopathic Medicine from West Virginia School of Osteopathic Medicine in 2009, completed her residency at Riverside Regional Medical Center Family Medicine in Newport News, and her fellowship in Maternal-Child Health at PCC in Chicago. She currently serves as the Chief Medical Officer of value-based care and regional director for West Virginia and Kentucky for MedCap Health and lives in Elkview, West Virginia.

Dr. McColley has been actively engaged in diversity, equity, and inclusion initiatives throughout her career. She has provided education locally, regionally, and nationally on the integration of transgender medicine and LGBTQ+ health into primary care and has advocated at the state level for equal rights laws for trans and gender-queer patients. She has also practiced maternal-child health medicine with full-scope gender care at a federally qualified health center in West Virginia, including a school-based clinic. She volunteers with Doc-for-the-Day for state government officials during legislative sessions and is actively involved with the Girl Scouts and Scouts BSA. She and her husband have three kids, a cat named Meer, and a dog called Boulder. She thinks that baking is therapy and considers herself deeply Appalachian.

EXCELLENCE IN ADVOCACY AWARD

The ACOFP Excellence in Advocacy Award recognizes family medicine physicians who have significantly contributed their time and expertise to national healthcare policy issues, and is presented in honor of Marcelino J. Oliva Jr., DO, FACOFP *dist.*

Jonathan W. Torres, DO, MPA, FILM, FACOFP, FAAO

Dr. Torres received his Doctor of Osteopathic Medicine from Rowan-Virtua School of Osteopathic Medicine in 2009, and completed his family medicine residency at Rowan SOM and NMM/OMM Plus one at Rowan SOM.

He is currently section chief of osteopathic neuromusculoskeletal medicine, associate program director, ONMM-3, and director of osteopathic education at Atlantic Health in Morristown, New Jersey. Dr. Torres is actively engaged in physician advocacy at both the state and national levels, including being a consistent participant and repeat speaker at DO Day. He has also completed three runs for elected office in New Jersey, forging strong relationships with elected state representatives that help advance issues affecting physicians and our patients.

He received the Distinguished Service Award in 2020 and is currently chair of the CORTEx Workgroup, among many other current and past volunteer positions with ACOFP, including serving as a delegate. He also holds several leadership positions in AAO, including serving on the board of governors, and is the president of the New Jersey Association of Osteopathic Physicians & Surgeons. He was named the Physician of the Year in Research and Education for the Atlantic Health System in 2024. Outside of his professional work, Dr. Torres enjoys spending time outdoors with his wife, Nicole, and his teenage children, Cassie and Xavier.

NEW OSTEOPATHIC FAMILY PHYSICIAN OF THE YEAR

The ACOFP New Osteopathic Family Physician of the Year Award recognizes physicians who have made significant contributions to family medicine between 2–5 years after entering the specialty.

Christopher P. Kennedy, DO

Dr. Kennedy received his Doctor of Osteopathic Medicine degree from West Virginia School of Osteopathic Medicine (WVSOM) in 2017 and completed his residency at United Hospital Center. He currently serves as Associate Professor of Clinical Sciences at WVSOM, while also maintaining an outpatient clinical practice, and is the program director for the Greenbrier Valley Medical Center Family Medicine Residency.

Dr. Kennedy has a longstanding passion for teaching and for serving underserved populations, particularly in rural communities. His commitment to these areas has led to active involvement in both undergraduate and graduate medical education, as well as ongoing efforts to strengthen service initiatives throughout rural West Virginia and beyond.

He serves nationally on the ACOFP In-Service Exam Work Group, Preceptor Committee, and New Physicians in Practice Committee. At the state level, he is treasurer of the West Virginia ACOFP Chapter and is an active member of the Christian Medical and Dental Association.

Dr. Kennedy has been recognized for his leadership and service with the Generation Next: 40 Under 40 Award from The State Journal of West Virginia and, in 2022, the WVSOM President's Outstanding Faculty Award.

He has been married to his beautiful wife for 10 years, with three amazing children ages 8, 5, and 1. They are dedicated members of their local church.

OSTEOPATHIC EDUCATOR OF THE YEAR

The ACOFP Osteopathic Family Medicine Educator of the Year Award honors individuals who exemplify the osteopathic family medicine profession's highest standards of excellence in teaching and have made efforts towards the academic achievement of osteopathic students and residents.

Deborah Schmidt, DO

Dr. Schmidt received her Doctor of Osteopathic Medicine from the West Virginia School of Osteopathic Medicine (WVSOM) in 1988 and completed her family medicine residency at Community Hospital of Lancaster, Pennsylvania, in 1991. She is a professor in the Department of Osteopathic Principles and Practice at WVSOM in Lewisburg, West Virginia. At WVSOM, she has served as department chair, OPP curriculum coordinator for years 1–4, and ONMM residency preceptor and assistant director for hospital consult and continuity clinic, ensuring the osteopathic philosophy is seamlessly integrated into the rural family medicine continuum of care.

Her teaching involvement since 1999 at all levels of academic and clinical education has impacted thousands of medical students and residents, many of whom now practice in underserved communities. Her leadership in the West Virginia State Opioid Response initiative — through which she trained over 100 healthcare providers and students in non-pharmacologic treatment of substance use disorder — exemplifies her ability to apply osteopathic principles to some of our most pressing public health crises.

She has served on the Educational Council on Osteopathic Principles, the NBOME, the American Academy of Osteopathy (AAO) Board of Trustees, the Louisa Burns Osteopathic Research Committee of the AAO, and the West Virginia ACOFP Board. She was named Distinguished Alumna of WVSOM and has received the President's Outstanding Clinical Faculty Award twice. She authored a chapter in the recently published *Foundations of Osteopathic Medicine*, 5th edition, and is currently involved in clinical research and student health at WVSOM.

OUTSTANDING FEMALE LEADER AWARD

The ACOFP Outstanding Female Leader Award honors female physicians who serve as role models, teachers, leaders, and sources of inspiration for men and women alike.

Kerry E. Agnello, DO, FACOFP

Dr. Agnello received her Doctor of Osteopathic Medicine from New York College of Osteopathic Medicine (NYCOM) in 2002. She completed her residency at Warren Hospital Family Medicine Residency. She currently serves as the director of the Medical Evaluation Board at Womack Army Medical Center at Fort Bragg, North Carolina. In this role, she oversees the Army's largest medical evaluation board, providing care and assessment for soldiers with career-impacting injuries and illnesses.

Dr. Agnello is an NBOME item writer/reviewer for COMAT Family Medicine and COMLEX Level 1, as well as a North Carolina delegate to the ACOFP Congress of Delegates. Dr. Agnello's past recognitions include the ACOFP Writer's Award from the Conclave of Fellows, Attending of the Year, Warren Hospital; and Intern of the Year at Warren Hospital Family Medicine Residency. Agnello is the school physician and a founding board member of the Anderson Creek Academy Charter School and Pastoral Council Secretary at St. Elizabeth Ann Seton Catholic Church. She met her husband, Robert Agnello, on her first day at NYCOM, and they have been happily married for 25 years and share one daughter, Claire. Dr. Agnello's parents, Maryann and Bill, are pharmacists. Working in their pharmacy growing up inspired her path in medicine.

DISTINGUISHED SERVICE AWARDS

The ACOFP Distinguished Service Award honors individuals who demonstrate outstanding service to ACOFP through committee involvement or other activities that help achieve ACOFP's objectives.

Bonyo Bonyo, DO

Dr. Bonyo was born and raised in the village of Wangaya, Kenya, where resources were limited, but dreams were big. From a young age, he knew he wanted to become a doctor, not just for himself, but so he could one day return and help his community thrive. That dream took him to the United States, where he studied medicine. He now runs a successful private family practice in Akron, Ohio, treating every patient with the same compassion and care that defines his global work. In 1995, Dr. Bonyo returned to Wangaya for the first of many medical missions, bringing a team of healthcare professionals and a vision to provide care where needed most. What started as a single trip turned into a life's calling. He has led annual missions ever since, providing thousands across rural Kenya with free healthcare services, medications, and support.

As the founder of Bonyo's Kenya Mission, Dr. Bonyo has grown the organization from a grassroots effort into a thriving, multi-dimensional nonprofit rooted in access, dignity, and sustainability. Bonyo's Kenya Mission is celebrating its 30th anniversary in 2026.

W. Joshua Cox, DO, FACOFP

Dr. Cox earned his Doctor of Osteopathic Medicine from Kansas City University in 2000. He currently serves as executive dean of the College of Osteopathic Medicine (COM) and vice provost for Medical Affairs at KCU. In October 2025, Dr. Cox was additionally appointed interim provost, a role in which he provides leadership, vision, direction, and advocacy as the University's chief academic officer.

Dr. Cox began his career as a family physician for the US Army, and in 2006 joined the KCU faculty. During his tenure at the University, he has served in a number of capacities, including professor of Family Medicine, chair of Primary Care, associate dean for Clinical Education, COM campus dean for Kansas City, and most recently as interim executive dean. Dr. Cox has served on numerous professional boards and committees, including the Board of Directors of DO Care International, the American Association of Family Physicians (AAFP) Commission on Education, and the NBOME Standard Setting Committee. He is a longtime representative of Missouri in the ACOFP Congress of Delegates. His past recognitions include the Osteopathic Family Medicine Educator of the Year Award in 2019.

Rodney M. Wiseman, DO, FACOFP *dist.*

Dr. Wiseman is a decorated veteran who initially entered medicine as a combat medic in Vietnam, earning the Bronze Star. He received his Doctor of Osteopathy from the Texas College of Osteopathic Medicine, and after his internship, became a regimental surgeon and flight surgeon at Fort Bliss, Texas. He practiced geriatric medicine in Texas for over 45 years.

Dr. Wiseman served as president of ACOFP in 2017-2018. During his tenure as president, ACOFP faced the agreement to merge osteopathic and allopathic residency accreditation into a Single Accreditation System (SAS), which ACOFP had initially opposed, making 2017-2018 a time of uncertainty and epic change. Dr. Wiseman was just the right leader to guide ACOFP into this new age. Under his leadership, ACOFP kept all the osteopathic residencies functioning and helped most of them make the transition into the single accreditation system by obtaining osteopathic recognition, a key component to preserving our osteopathic heritage. Dr. Wiseman was also passionate about increasing student and resident numbers.

Dr. Wiseman is currently a member of the Leadership Development Committee and the Legacy Group, and represents Texas in the Congress of Delegates. He served as speaker of the Congress of Delegates from 2003 until he became a member of the Board of Governors. A native Texan, Dr. Wiseman has also held many offices within state osteopathic associations.

Ana Karina Zuñiga Cox

Ana Karina Zuñiga Cox is a certified interpreter. She has been instrumental in helping Kansas City University establish connections with hospitals, universities, and even the media in the Dominican Republic. Over a decade and a half of work in that region has led to strong ties, as well as thousands of people being exposed to osteopathic family medicine. As an interpreter, She does far more than convert words from one language to another—she carries meaning, trust, and the philosophy of osteopathic medicine across cultures.

Through Ana's work, countless individuals have been introduced to osteopathic principles, helping the ACOFP achieve its goals. Her efforts have helped open doors and build understanding not only in the Dominican Republic, but also in China, Panama, and in communities across the United States, strengthening connections between physicians and patients, educators and learners, and our profession and the wider world. Ana reminds us that advancing osteopathic family medicine is not only about what we do within our practices, but also about how we communicate, welcome, and serve, especially when language could otherwise be a barrier.

SANDER A. KUSHNER, DO, FACOFP MEMORIAL OSTEOPATHIC FAMILY MEDICINE RESIDENT AWARD

The Sander A. Kushner, DO, FACOFP Memorial Osteopathic Family Medicine Resident Award, sponsored by the ACOFP Foundation, honors residents who demonstrate outstanding academic achievement and motivation for careers in osteopathic family medicine.

Aaron Lagoy Bautista, DO

Dr. Bautista received his Doctor of Osteopathic Medicine degree from Western University of Health Sciences, College of Osteopathic Medicine of the Pacific in 2025, and is currently a resident at Kaiser Permanente Washington Family Medicine Residency in Seattle, Washington.

Dr. Bautista is recognized for his commitment to fostering learning environments grounded in kindness, trust, and psychological safety. His leadership has been shaped by his service as student government president, peer mentor, and community educator on the social determinants of health. He believes meaningful medical education begins with human connection, listening with intention, leading with humility, and empowering learners to show up authentically and confidently as future physicians. His honors include the AAFP Emerging Leader Institute Leadership Project Award and a National Health Service Corps (NHSC) Scholarship. In 2025, he was selected as his medical school's graduate commencement speaker.

Outside of medicine, Dr. Bautista enjoys weightlifting and endurance trekking, including completing the five-day Salkantay Trail to Machu Picchu. He was raised near the California–Mexico border, where his family continues to reside, along with his beloved dogs, Bruce and Lexi.

MASTER PRECEPTOR AWARDS

The ACOFP Distinguished Service Award honors individuals who demonstrate outstanding service to ACOFP through committee involvement or other activities that help achieve ACOFP's objectives.

Douglas W. Harley, DO, FACOFP, FAAFP

Dr. Harley received his Doctor of Osteopathic Medicine from Ohio University Heritage College of Osteopathic Medicine in 2002, and completed his residency at Humility of Mary Health Partners: St. Joseph Health Center, in Warren, Ohio. He is AOA Board certified through the American Osteopathic Board of Family Medicine and currently serves as the Vice Chair of Education for the Primary Care Institute at Cleveland Clinic in Ohio.

His work has focused on leading and teaching while remaining closely engaged in daily precepting, ensuring learner-centered training environments that integrate osteopathic principles, evidence-based care, and professional identity formation. Through sustained mentorship and hands-on supervision, he has supported learner growth, scholarly engagement, and patient-centered practice. He serves on the ACOFP Practice Management Committee and Procedural Medicine Workgroup as well as being a delegate to the Congress of Delegates. He is a past president of the Ohio Osteopathic Association and has held many leadership positions in the Ohio Academy of Family Physicians. His past honors include the Distinguished Service Award from OUHCOM and Family Physician of the Year from the Ohio ACOFP.

He is married to Danielle K. Harley, and they have two amazing adult children. He has a hobby farm in northeast Ohio, and he also enjoys traveling, art, and architecture.

Matthew W. Told, DO, MPH

Dr. Told received his Doctor of Osteopathic Medicine from Nova Southeastern University Florida (KPCOM) in 2008 and completed his residency at Rapid City South Dakota Family Medicine Residency. He currently serves as an attending physician at Syringa Hospitals and Clinics in Grangeville, Idaho. Since 2018, he has accepted medical students and residents at his hospital from across Idaho and all three campuses of RVU for rural family medicine. We focus on Inpatient, clinic, surgical procedures, and OB.

He currently serves on the ACOFP Annual Convention Work Group and Procedural Medicine Work Group. He was the founding president of the ACOFP-Mountain West Society in 2023. He also teaches health classes as a volunteer, is a sports physician for high school sports, and is in the EMS directory for four rural ambulance agencies. He has been named a Best Physician in Idaho County for five years running.

Dr. Told is very appreciative of his family, including his father, who is a passionate role model in ACOFP; his five children, pursuing careers ranging from physician to esthetician; and a beautiful wife who holds his world together and makes him a better person.

MARIE WISEMAN OUTSTANDING OSTEOPATHIC MEDICAL STUDENT OF THE YEAR AWARD

The Marie Wiseman Outstanding Osteopathic Student of the Year Award recognizes an osteopathic medical student who demonstrates strong philanthropic and community service.

Maduka Gunasinghe, OMS-IV

Student Dr. Gunasinghe received his undergraduate degree from Rochester Institute of Technology, where he was honored with the Bruce R. James '64 Distinguished Public Service Award, the university's highest recognition for public service. He is currently a fourth-year student at Rowan-Virtua School of Osteopathic Medicine in Stratford, New Jersey. Raised in Sri Lanka and across diverse communities in the United States, and having completed family medicine rotations in New Jersey, Pennsylvania, Wisconsin, Washington, California, and Florida, he brings a broad cultural and geographic perspective to his work in osteopathic family medicine. During this time, he shared his experiences through ACOFP Voice, writing about regional challenges in patient care while advocating for the osteopathic principles that remain constant across communities. His interests center on advancing access, continuity, and relationship-centered care, with a commitment to strengthening whole-person care at both the patient and systems levels through hands-on, osteopathic primary care in underserved settings.

He serves on the Education Committee of the ACOFP Student Association, founded Student Leaders in Patient Safety at Rowan-Virtua SOM, and served as a Curriculum Committee Representative during his preclerkship years. In these roles, he has advanced student engagement in osteopathic advocacy, medical education, and quality improvement. He is a National Health Service Corps Scholar and a 2025 Pisacano Scholar, one of 10 U.S. medical graduates selected nationally by the ABFM. He is also a recipient of the Leonard Tow Humanism in Medicine Award for exemplifying compassion, professionalism, and cultural humility in clinical care.

He plans to pursue residency training in family medicine and remain committed to delivering equitable, community-centered osteopathic care.

EMERGING OSTEOPATHIC STUDENT LEADER AWARDS

The Emerging Osteopathic Student Leader Awards recognize up to four exceptional osteopathic medical students who have made meaningful contributions to ACOFP, demonstrated a strong commitment to family medicine, and shown a dedication to community service.

Patricia K. Balatbat, OMS-III

Student Dr. Balatbat is a medical student at A.T. Still University School of Osteopathic Medicine in Arizona. During her first year, she had the honor of serving as president of her school's ACOFP chapter. In that role, she developed as a leader, advocated for the versatility of family medicine, and formed a supportive community. ACOFP has continued to shape her journey by providing opportunities to serve as membership committee chair and journal peer reviewer, roles through which she supports her peers by expanding access to mentorship, leadership development, and organizational resources. She is deeply grateful for the mentors she has met through ACOFP. Their dedication to comprehensive, community-centered care continues to inspire her as she works toward practicing full-scope Family Medicine rooted in empowerment, continuity, and service.

Valerie Domingo, OMS-III

Student Dr. Domingo received her undergraduate degree from the University of California, Davis, and is currently a medical student at California Health Sciences University College of Osteopathic Medicine (CHSU-COM). She serves as the ACOFP National Student Executive Board Secretary. She is currently the CHSU-COM student chapter liaison and served as president in 2024-2025. She is passionate about continuity of care and advancing patient well-being through preventive, compassionate, and holistic care. In her personal time, she enjoys challenging herself through weightlifting, Pilates, and Lagree; cooking international cuisine; hiking; and exploring new cities.

Meihui He, OMS-II

Student Dr. He received her undergraduate degree from the University of Hawai'i at Manoa and is currently a student at Rocky Vista University College of Osteopathic Medicine. She is the president of the RVUCOM student chapter and serves on the ACOFP Student Public Relations Committee. She is also the treasurer of both the RVUCOM Chapter of the Asian Pacific American Medical Student Association and the RVUCOM Chapter of the Rotary Club. She is deeply committed to community service and volunteering with Special Olympics Colorado, where she worked with athletes with intellectual disabilities to advance health, wellness, and inclusive participation.

Cosette Lim, OMS-III

Student Dr. Lim received her undergraduate degree from Stevens Institute of Technology, and is currently a medical student at Edward Via College of Osteopathic Medicine, Virginia Campus, in Blacksburg, Virginia. As vice president of the student chapter at VCOM-VA, she expanded the community service branch to provide new outreach opportunities for students. She coordinated over 250 service hours in one academic year, allowing osteopathic medical students to help address issues with food insecurity, housing insecurity, and primary care in the Southwest Virginia region. She also serves on the ACOFP Student Public Relations Committee and is a student member of the Medical Society of Virginia. She is a volunteer with Habitat for Humanity in the Roanoke Valley. Past recognitions include the ACOFP Chapter President's Award and awards from the Translating Osteopathic Understanding into Community Health (TOUCH) Program.

Outside of medicine, she enjoys cooking and running outdoors, as well as exploring new places with her friends and family.

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Conclave of Fellows

OF THE AMERICAN COLLEGE OF OSTEOPATHIC FAMILY PHYSICIANS

The Fellow (FACOFP) and Distinguished Fellow (FACOFP *dist*.) designations represent two of the highest honors bestowed by the American College of Osteopathic Family Physicians. These recognitions acknowledge members who have demonstrated exceptional commitment to osteopathic family medicine, the College, and the patients and communities they serve.

The Fellow designation (FACOFP) recognizes physicians who have made significant contributions through leadership, service, education, and professional achievement. Fellows exemplify the values of osteopathic medicine and actively support the mission and growth of ACOFP.

The Distinguished Fellow designation (FACOFP *dist*.) is reserved for those who have demonstrated sustained excellence and extraordinary service at the highest level. These individuals have made lasting, impactful contributions to the profession and the College, often serving as leaders, mentors, and advocates over many years.

Together, these designations reflect a deep commitment to advancing osteopathic family medicine and improving patient care through leadership, service, and dedication.

FELLOW AWARDS OF THE AMERICAN COLLEGE OF OSTEOPATHIC FAMILY PHYSICIANS

Daryl J. Callahan, DO, MS, FACOFP

Dr. Callahan earned his Doctor of Osteopathic Medicine from Kansas City University in 1988 and completed his post-graduate training at Lakeside Hospital in Kansas City, Missouri. Dr. Callahan has served on the ACOFP Annual Convention Work Group and currently serves on the OMED Work Group and the CME Advisory Committee. Dr. Callahan's academic roles include Clinical Associate Professor at Kansas City University and affiliate faculty appointment at the Kansas College of Osteopathic Medicine.

A longtime leader within the Kansas osteopathic community, Dr. Callahan is a past president of the Kansas Association of Osteopathic Medicine. His public service includes multiple state advisory boards and representing Kansas at the AOA House of Delegates.

He is a retired U.S. Army Colonel, serving thirty years in the National Guard, including positions as Medical Commander, State Surgeon, and as Senior Medical Advisor to U.S. Northern Command/NORAD. Colonel Callahan is a recipient of the Order of Military Medical Merit in recognition of excellence from the Army Medical Department. He is a veteran of multiple deployments in support of the Global War on Terrorism, Operation Iraqi Freedom, Homeland Defense, and Emergency Duty Service.

Dr. Callahan has recently published articles in *The DO*, including "New documents illuminate the Civil War legacy of A.T. Still, DO" and "A brotherhood of veterans: Read about the enduring bond between A.T. Still, D.O., and his Civil War Colonel." He is currently co-authoring a book entitled "Dr. Still Goes to War," under contract with McFarland Publishing. Dr. Callahan's research is focused on osteopathic history, particularly A.T. Still's notable military service, and he maintains a website atstilldo.com.

Sponsor: Mary Franz, DO, FACOFP
Paper: "Supremacy of the Artery First Postulate of A.T. Still"

Seth H. Carter, DO, MSMEd, FACOFP

Dr. Carter earned his Doctor of Osteopathic Medicine from Lake Erie College of Osteopathic Medicine in 2016. He completed his family medicine residency at LECOM Health–Millcreek Community Hospital in Erie, Pennsylvania. He is Chief of Staff for both LECOM Medical Center and Corry Memorial Hospital and chairs the Medical Staff Executive Committee.

Dr. Carter has served on the ACOFP Resident Council, New Physicians Committee, Task Force on MDs and Osteopathic Recognition, National Student Executive Board, and the Board of Governors as Student Governor. He currently serves on the Resolutions Review and Constitution and Bylaws/Policy & Organizational Review Committees and attended the ACOFP Future Leaders program. He currently serves as a member of the ACOFP Congress of Delegates Pennsylvania Caucus, and has represented Pennsylvania as a student, resident, and physician delegate since 2014.

Sponsor: John J. Kalata, DO, FACOFP
Paper: "Osteopathic Manipulative Treatments Appropriate for Older Adults in the Clinic: A Narrative Review with Recommendations"
Recipient: 2026 Outstanding Research Crest

Alissa Cohen, DO, MS, DipACLM, FACOFP

Dr. Cohen earned her Doctor of Osteopathic Medicine from Philadelphia College of Osteopathic Medicine in 2008. She completed her family medicine residency at UPMC Shadyside in Pittsburgh, Pennsylvania, and is also board-certified in Lifestyle Medicine.

Dr. Cohen practices at UPMC Shadyside, where she serves as Associate Program Director for the Family Medicine Residency Program and plays a key role in resident education, mentoring, and program development. Dr. Cohen has served on the Women's Leadership Committee since 2022 and previously contributed to the Health and Wellness Committee. She is also a member of the Pennsylvania Osteopathic Medical Association and the Pennsylvania Osteopathic Family Physicians Society.

Sponsor: Jackie Weaver-Agostoni, DO, FACOFP
Paper: "Psychological and Emotional Support for Cancer Survivors in Primary Care"

Philip Cruz, DO, FACOFP

Dr. Cruz earned his Doctor of Osteopathic Medicine from NYIT College of Osteopathic Medicine in 2001. He completed his family medicine residency at the Mount Sinai School of Medicine Family Medicine Residency at Jamaica Hospital Medical Center in Jamaica, New York. He also did a primary care sports medicine fellowship at UMass Worcester.

Dr. Cruz has dedicated his career to advancing osteopathic education and residency training in urban family medicine settings. He currently serves as Director of Osteopathic Education at Jamaica Hospital Medical Center, where he leads the integration of osteopathic principles into graduate medical education and supports resident and faculty development.

Dr. Cruz maintains professional affiliations with state and national organizations.

Sponsor: Nancy Bono, DO, FACOFP *dist*.
Paper: "Improving and Implementing Osteopathic Documentation in an Urban Care Family Medicine Residency"

Jayme Decker, DO, MS, FACOFP

Dr. Decker earned her Doctor of Osteopathic Medicine from Kansas City University in 2014. She completed her family medicine residency at the University of Missouri–Kansas City Family Medicine Residency Program.

Dr. Decker serves on several national committees, including the Women in Leadership Committee, Awards Committee, and OMED Continuing Education Committee, and has represented Missouri as a delegate to the ACOFP House of Delegates.

At the state level, Dr. Decker serves on the Board of Governors and as Vice President of the Missouri Society of ACOFP. Her hospital leadership includes multiple executive committee and medical staff leadership roles at Cass Regional Medical Center.

Sponsor: Gautam Desai, DO, FACOFP *dist*.
Paper: "The Role of Osteopathic Family Physicians in Identifying Orbital Disease: A Case of Asymmetric Exophthalmos"

Eugene DiBetta, Jr., DO, FACOFP

Dr. DiBetta received his Doctor of Osteopathic Medicine from Lake Erie College of Osteopathic Medicine–Bradenton in 2009, and completed his family medicine residency at St. Petersburg General Hospital.

Dr. DiBetta is Chief Medical Officer of Paxton Medical Management, where he leads a physician-directed, full-risk Medicare Advantage population, advancing team-based primary care grounded in osteopathic principles and measurable outcomes.

He serves as Chair of the ACOFP Practice Management Committee and Liaison to the KLA Advisory Committee and previously served as Resident Governor on the ACOFP Board of Governors. A former Future Leaders Conference participant and current mentor, he remains actively engaged in leadership development within organized osteopathic medicine.

Dr. DiBetta serves as an examiner for the AOBFP Osteopathic Manipulative Treatment Performance Examination and contributes as a question writer for the AOBFP Family Medicine Longitudinal Assessment, supporting national standards in board certification.

Sponsor: Robert George, DO, FACOFP *dist.*
Paper: "Unveiling Complexity: Navigating a Case of Papillary Thyroid Carcinoma"

Matthew Else, DO, MBA, FACOFP

Dr. Else received his Doctor of Osteopathic Medicine and Master of Business Administration from the Oklahoma State University College of Osteopathic Medicine in 2016, and completed his family medicine residency at the Oklahoma State University Center for Health Sciences in Tulsa.

Dr. Else has served on the New Physicians Committee and as New Physician Liaison to both the CME Conference Advisory Committee and the Annual Convention Work Group. His additional service includes participation on the Practice Management Committee, Future Leaders Work Group, Resident Council, and multiple terms as an Oklahoma delegate to the ACOFP Congress of Delegates. He has served as a mentor for the Future Leaders Conference after previously attending the program.

At the state level, Dr. Else has served as Vice President and Resident Board Member of OK-ACOFP and remains active in community and national advocacy. He is also the primary author of a textbook chapter on diagnosing somatic dysfunction.

Sponsor: Rebecca Szewczak, DO, FACOFP
Paper: "Diagnosing Somatic Dysfunction"

Steven Ferreira, DO, FACOFP

Dr. Ferreira earned his Doctor of Osteopathic Medicine from Nova Southeastern University in 2016. He completed his family medicine residency at St. Petersburg General Hospital in St. Petersburg, Florida.

Dr. Ferreira's ACOFP leadership includes service on the Resident Council, the Practice Management Committee, and participation in the Gun Safety Task Force, contributing to advocacy, professional development, and practice sustainability initiatives.

Dr. Ferreira serves as an item writer and test examiner for the American Osteopathic Board of Family Physicians, supporting board certification and assessment standards. He maintains an active clinical practice affiliated with Blake Medical Center in Bradenton, Florida.

Sponsor: Stacy Chase, DO, FACOFP, FAOGME
Paper: "The Role of GLP-1 Receptor Agonist in Reducing All-Cause Mortality: Current Evidence and Future Projections"

Kathleen M. Henley, DO, FACOFP

Dr. Henley earned her Doctor of Osteopathic Medicine from Philadelphia College of Osteopathic Medicine in 2013. She completed her family medicine residency at Penn State Health St. Joseph Medical Center in 2016.

Dr. Henley's ACOFP roles include Pennsylvania Delegate to the Congress of Delegates and service on multiple committees, including Leadership Development, Membership and New Physicians. She has served as a mentor for the Future Leaders Conference after previously attending the program.

At the state level, Dr. Henley has held leadership roles within the Pennsylvania Osteopathic Family Physicians Society and is a member of the Maryland Association of Osteopathic Physicians. She practices at Atlantic General Hospital, where she serves as Chief of Medicine and provides leadership across utilization review, clinical documentation improvement, and multiple quality-focused committees.

Sponsor: Nicole H. Bixler, DO, MBA, FACOFP *dist.*
Paper: "Aortic Dissection: Identification of the Condition and Individuals at Risk"

Maleshea Yvonne Hopkins, DO, FACOFP

Dr. Hopkins earned her Doctor of Osteopathic Medicine from the Kentucky College of Osteopathic Medicine in 2005 and completed her family medicine residency at Pikeville Medical Center in Pikeville, Kentucky.

Dr. Hopkins has dedicated her career to clinical care, graduate medical education, and osteopathic leadership. She continues to practice family medicine and has served in numerous leadership roles, including Family Medicine Program Director, Director of Osteopathic Recognition, Director of Medical Education, and Chair of both the Program Evaluation Committee and Clinical Competency Committee.

Currently, Dr. Hopkins serves as Associate Dean of Clinical Affairs, Associate Professor of Family Medicine, Designated Institutional Official for Graduate Medical Education, and Chair of Continuing Medical Education at KYCOM. She is an active member of multiple institutional committees and professional organizations, including the Kentucky Osteopathic Medical Society, American Osteopathic Association, and Kentucky Rural Health Association. She received the KYCOM Excellence in Student Engagement Award in 2023 and completed the AACOM GME Fellowship in 2025.

Sponsor: Joe Kingery, DO, FACOFP
Paper: "Incidental Finding of Smoldering Myeloma in a Young Female: Case Report and Risk Stratification"
Recipient: 2026 Most Outstanding Research Award

Katheryn Kuehner, DO, FACOFP

Dr. Kuehner received her Doctor of Osteopathic Medicine from Des Moines University in 2006 and completed her family medicine residency at Valley Hospital Family Medicine in Las Vegas, Nevada, in 2010.

Dr. Kuehner's national service includes participation on the ACOFP Federal Legislation and Advocacy Committee, Practice Management Committee, and Community Health Work Group, contributing to physician advocacy and sustainability initiatives.

At the state and regional levels, Dr. Kuehner has held significant leadership roles, including serving as President of ACOFP Upper Midwest and President of the Iowa Chapter of ACOFP.

Sponsor: David J. Park, DO, FAAFP, FACOFP *dist.*

Paper: "Advances in Hormonal Therapies and Medical Management for Women's Reproductive Health: An Osteopathic Perspective"

Anthony Nazione, DO, MS, FACOFP

Dr. Nazione earned his Doctor of Osteopathic Medicine from the Michigan State University College of Osteopathic Medicine in 2013. He completed his family medicine residency at the Atrium Health Floyd Family Medicine Residency in Rome, Georgia.

Dr. Nazione serves as Vice President of the Georgia Society of ACOFP, supporting physician engagement and advancing osteopathic family medicine statewide.

Dr. Nazione practices at Atrium Health Floyd Medical Center, where he is Director of Osteopathic Education, Associate Program Director of the Family Medicine Residency, and faculty attending physician. In these roles, he integrates osteopathic principles into graduate medical education and mentors resident physicians. He is also a member of the American Academy of Family Physicians and the Georgia Academy of Family Physicians.

Sponsor: L. Michael Waters Jr., DO, FACOFP
Paper: "The Incorporation of Osteopathic Philosophies in Hospice Care: A Review of Existing Clinical and Educational Applications"

Katherine Penderson, DO, MS, FACOFP

Dr. Penderson received her Doctor of Osteopathic Medicine from A.T. Still University–Kirksville College of Osteopathic Medicine in 2014. She completed an Integrated Family Medicine/Neuromusculoskeletal Medicine Residency through the University of North Texas Health Science Center and the Texas College of Osteopathic Medicine in Fort Worth, Texas.

Dr. Penderson is dedicated to advancing osteopathic family medicine across the lifespan, with a strong commitment to comprehensive, patient-centered care. She has served on the ACOFP New Physicians Committee, contributing to mentorship initiatives and leadership development for emerging physicians. She remains actively involved in the Texas chapter of ACOFP and serves on the Texas Osteopathic Medical Association (TOMA) Board.

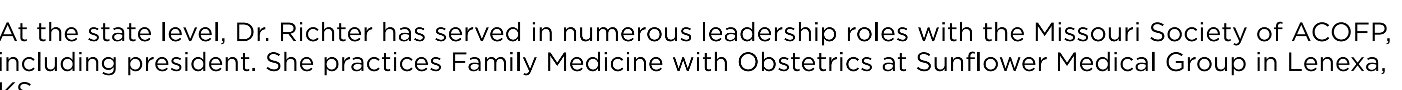
Her research reflects her commitment to evidence-based practice and the continued integration of osteopathic principles within family medicine.

Sponsor: Carol Brown, DO, FACOFP
Paper: “Case Report: Improvement of Gastroesophageal Reflux and Weight Gain Following Frenotomy in a 4-Month-Old Infant”

Jessica Richter, DO, MPH, FACOFP

Dr. Richter earned her Doctor of Osteopathic Medicine from Lake Erie College of Osteopathic Medicine–Bradenton in 2015, and completed her family medicine residency at the University of Missouri–Kansas City.

Dr. Richter’s national service includes participation on the New Physicians Committee, Preceptor Committee, and Convention Committee. She has served as a mentor for the Future Leaders Conference after previously attending the program, as well as serving as a Missouri delegate to the ACOFP Congress of Delegates since 2019. She speaks frequently at conferences, particularly on Down Syndrome, and is a presenter at this year’s ACOFP convention.



At the state level, Dr. Richter has served in numerous leadership roles with the Missouri Society of ACOFP, including president. She practices Family Medicine with Obstetrics at Sunflower Medical Group in Lenexa, KS.

Sponsor: Ian Fawks, DO, FACOFP
Paper: “Early Detection and Management of Gestational Diabetes Mellitus: A Case Study Exploring the Benefits of Comprehensive Metabolic Treatment in Pregnancy”

Danielle Schehr-Kimble, DO, FACOFP

Dr. Schehr-Kimble earned her Doctor of Osteopathic Medicine from Kirksville College of Osteopathic Medicine in 2001. She completed her family medicine residency at Long Beach Medical Center in Long Beach, New York in 2004.

Dr. Schehr-Kimble's national service includes participation on the ACOFP Ethics Committee as well as Congress of Delegates Reference Committees, contributing to policy review and ethical guidance. At the state level, she is actively involved with the New Jersey Chapter of ACOFP and has served as a delegate to the ACOFP Congress for more than 10 years.

She was Core Clinical Faculty for the Christ Hospital Family Medicine Residency Program from 2012 to 2022 as well as the Program Director for the Bayonne Medical Center Family Medicine Residency Program from 2016 to 2022.

Dr. Schehr-Kimble is currently practicing Family Medicine at her Concierge Medical Practice in New Jersey.

Sponsor: Antonios Tsompanidis, DO, FACOFP *dist.*
Paper: "Case Study: Incidental Discovery of Benign Ovarian Serous Cystadenoma During Evaluation for Hormone Replacement Therapy in a Perimenopausal Woman"

Jennifer Sepede, DO, FACOFP

Dr. Sepede earned her Doctor of Osteopathic Medicine from Philadelphia College of Osteopathic Medicine in 2014. She completed her family medicine residency at Rowan University School of Osteopathic Medicine/Kennedy Health Systems/Our Lady of Lourdes in Stratford, New Jersey.

Dr. Sepede serves on the ACOFP Preceptorship Committee and is an invited annual presenter at a regional continuing medical education conference sponsored by the New Jersey Association of Osteopathic Physicians and Surgeons and RowanSOM.

Dr. Sepede holds several academic leadership roles at RowanSOM, including Associate Program Director of the Virtua Family Medicine Residency and Course Director for the second-year Physical Diagnosis course. She serves on multiple institutional committees and is National Faculty for the National Board of Osteopathic Medical Examiners.

Sponsor: Danielle Cooley, DO, FACOFP
Paper: "Innovative Preclerkship Teaching Technique: Integrating the Osteopathic Structural Exam into the Physical Diagnosis Course"

Lauren Strohm, DO, FACOFP

Dr. Strohm earned her Doctor of Osteopathy from Philadelphia College of Osteopathic Medicine in 2009. She completed her family medicine residency at Excela Health Latrobe Family Medicine Residency in Latrobe, Pennsylvania.

Dr. Strohm's history of service began early in her career, including roles as the National Student Executive Board President and on the Public Health and Wellness Committee and Membership and Marketing Subcommittee. She also serves as a delegate to the ACOFP Congress of Delegates, representing Pennsylvania.

Dr. Strohm practices at St. Luke's Physician Group and serves as Core Faculty and Associate Program Director for the St. Luke's Family Medicine Residency–Anderson. She is also a member of the St. Luke's Continuing Education Advisory Council.

Sponsor: Lynn M. Wilson, DO, FACOFP, FAAFP, AGSF, DipABLM
Paper: "A Primary Care Approach to Infertility"

DISTINGUISHED FELLOW AWARDS OF THE AMERICAN COLLEGE OF OSTEOPATHIC FAMILY PHYSICIANS

Lorenzo L. Pence, DO, FAODME, FACOFP *dist*.

Dr. Pence earned his Bachelor of Science from Bluefield State College in Bluefield, West Virginia, in 1981, and his Doctor of Osteopathic Medicine from the West Virginia School of Osteopathic Medicine in 1985. He completed his family medicine residency at Parkview Hospital in Toledo, Ohio, in 1987, and is board-certified in family medicine, holding active medical licenses in West Virginia, Ohio, and Virginia.

Dr. Pence has devoted his career to advancing osteopathic family medicine through education, leadership, and national service. His commitment to teaching began in private practice as a preceptor for osteopathic medical students and expanded into academic leadership roles, including Associate Program Director and Director of Medical Education, CORE Assistant Dean, followed by service as Program Director and Designated Institutional Official at multiple institutions. At the West Virginia School of Osteopathic Medicine, Dr. Pence served as Professor of Family Medicine, Associate Dean for Graduate Medical Education, Academic Officer of the MSOPTI, Chair of the MSOPTI, and ultimately as Dean. A dedicated member of the American College of Osteopathic Family Physicians, Dr. Pence became a Fellow of the ACOFP in 2003. His national leadership includes service as Chair of the AOA Council on Postdoctoral Training Institutions, Chair of West Virginia Southeastern AHEC, and as a member of the Board of Deans of the American Association of Colleges of Osteopathic Medicine.

Dr. Pence completed an AOA Health Policy Fellowship from Ohio University Heritage College of Osteopathic Medicine/Michigan State University College of Osteopathic Medicine. He has been the recipient of several awards and recognitions including AOA, Mentor of the Year; ACOFP, Excellence in Advocacy; AACOM/AOGME, Special Lifetime Achievement Award; Association for Hospital Medical Education (AHME), John C. Leonard Award; Institute of Medicine Chicago (IOMC), Billings Fellow; ACOFP, Distinguished Service; ACOFP, Fellow; AODME/AOGME, Fellow; and AOA, Guardian of the Profession.

Currently, Dr. Pence serves as Senior Vice President for Osteopathic Accreditation at the Accreditation Council for Graduate Medical Education (ACGME), where he continues to shape graduate medical education and mentor future generations of physicians. He has delivered numerous national presentations and workshops for organizations including ACOFP, AOA, ACGME, AACOM, AOGME, AODME, AHME, and OPTIs. Dr. Pence has been an active member of ACOFP for more than two decades, serving on numerous committees and as a longtime delegate to the ACOFP Congress of Delegates. His lifelong dedication to osteopathic education and leadership exemplifies the ideals of a Distinguished Fellow of the ACOFP.

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