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# Mental Health Manifestations of Lyme Disease

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Mental health concerns can manifest as a result of chronic and acute infections. One of the most commonly missed causes of mental health symptoms is lyme disease.

## What is Lyme Disease?

Lyme borreliosis (LB) is an infectious disease caused by the bacteria *Borrelia burgdorferi* and other *Borrelia* species such as *Borrelia garinii* and *Borrelia afzelii*. Other tick-borne infections are commonly present as well, the most common of which are *Anaplasma phagocytophilum*, *Babesia* species, *Bartonella* species, *Ehrlichia chaffeensis*, and *Rickettsia* species. Secondary opportunistic infections are also common due to immunosuppression that occurs with LB.

## Which Body Systems Does Lyme Disease Affect?

LB is a multi-system condition affecting the skin, musculoskeletal system, central and peripheral nervous systems, heart, urinary system, eyes, and other parts of the body. There is increasing evidence for and awareness of psychological (mental and emotional) and neuropsychological (brain and behavior) symptoms caused by LB.

Thanks to Long COVID or post-acute sequelae of COVID-19 (PASC), the medical community is becoming more aware of the causal association between infections and mental illness. Over 100 different infectious agents are known to cause mental illness, including spirochetes such as *Borrelia* species, other bacteria, viruses, parasites, protozoa, yeasts, fungi and prions.

### How Is Lyme Disease Transmitted?

While we refer to these infections as “tick-borne infections”, it is important to note that congenital (present at birth) transmission from mother to fetus has been well-documented. Further complicating diagnosis, LB may have a latency period of many years before symptoms of late infection develop,

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often after a triggering event such as a physical stressor such as a car accident, head trauma or emotional stressor such as grief. For more information on LB see our previous blogs .

## Immune System Effects Caused By Lyme Disease

While some LB symptoms are due to direct injury by the bacterial infection on the host, more often it is the immune reaction that results in the majority of symptoms. Immune-mediated effects include persistent inflammation and autoimmunity. Anti-neuronal antibodies, or antibodies that bind and trigger immune attack on neurons, are known to be elicited by the host's immune response to B. burgdorferi. Metabolic changes are also common including oxidative stress, excitotoxicity, changes in homocysteine metabolism, mitochondrial dysfunction, altered tryptophan catabolism, decreased serotonin and increased quinolinic acid.

## What Are Some of the Mental Health Conditions Associated With Lyme Disease?

Common psychiatric findings associated with LB include paranoia, dementia, schizophrenia, bipolar disorder, panic attacks, major depression, anorexia nervosa, and obsessive-compulsive disorder. A staggering 80% of children with psychiatric illness referred to a child psychiatrist demonstrated evidence of exposure to one or more of the pathogens *B. burgdorferi, Bartonella, Babesia, Ehrlich* and *Anaplasma* on serologic testing.

Other psychiatric and neurologic symptoms include:

- Irritability or mood swings
- Anger or rage
- Anxiety
- Anhedonia
- Depression
- Emotional lability
- Obsessive compulsive disorder
- Nightmares
- Depersonalization
- Dissociative episodes
- Decreased libido
- Suicidal thoughts
- Developmental delays
- Tic disorders
- Seizure disorders
- Involuntary athetoid movements (slow, involuntary, writhing movements)

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- Photophobia (eye discomfort in bright light)
- Auditory hyperacuity (reduced tolerance to sound)
- Other hypersensitivity (touch, taste or smell)
- Poor memory
- Cognitive impairments
- Speech delays (when a child isn't developing speech and language at an expected rate)
- Reading/writing impairments
- Articulation impairments
- Auditory/visual processing impairments
- Word selectivity impairments
- Dyslexia
- Decline in social functioning

## Other common symptoms seen in LB include:

- Poor attention span
- Being easily distracted by frustration
- Sensory hypersensitivity causing overwhelm
- Poor short-term memory
- Slow processing
- Executive dysfunction
- Brain fog
- Poor time management
- Depersonalization
- Intrusive images and thoughts
- Musical hallucinations
- Low frustration tolerance
- Abrupt mood swings
- Impulsivity
- Paranoia
- Explosive anger
- Suicidal thoughts or intentions
- Anhedonia (inability to feel pleasure)

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- Decreased productivity
- Long duration panic attacks
- Social and generalized anxiety
- Non-restorative sleep
- Appetite disturbances
- Decreased libido
- Headaches
- Cranial nerve symptoms
- Neuropathy
- Autonomic nervous system symptoms
- Musculoskeletal symptoms
- Gastrointestinal symptoms
- Genitourinary symptoms
- Cardiovascular symptoms
- Fatigue
- Chronic pain
- Alcohol intolerance

## Testing Controversies

Laboratory testing for B. burgdorferi, other Borrelia species, and co-infections are notoriously unreliable, contributing to an unfortunate degree of under-diagnosis and frequent progression to psychiatric disease. The CDC itself states that the two-tier CDC surveillance criteria most commonly used in clinical practice "was developed for national reporting of Lyme disease; it is not intended to be used in clinical diagnosis". Meta-analyses have demonstrated significant limitations of the sensitivity of testing. Yet, many doctors are not well educated on Lyme disease and rely on poor laboratory testing to "rule out" Lyme disease. **While improved tests are being developed, no test currently has the capacity to *rule out* the possibility of LB completely.** Lyme disease is a ***clinical diagnosis***, meaning, a current active infection is best diagnosed based on clinical multi-systemic disease symptoms and supported by laboratory testing indicating immune reactivity.

## The Need For A Different Perspective on Mental Health Illness

Historically, mental illnesses have been categorized based upon symptoms and syndromes since 1952 by the American Psychiatric Association in Diagnostic and Statistical Manuals (DSM). This categorization has taken the focus away from the cause of mental illness and therefore away from any chance of restoring an individual to health through curative, root cause treatments. When 1 in 5 American adults and 1 in 12 American children are on psychiatric medications, and when impulsive

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erratic behavior such as school shootings are happening on a weekly basis, we must shift our focus in medicine toward improved screening and testing, improved treatments, and holistic approaches that address the whole person's health: mind, body, and spirit.

## REFERENCES

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