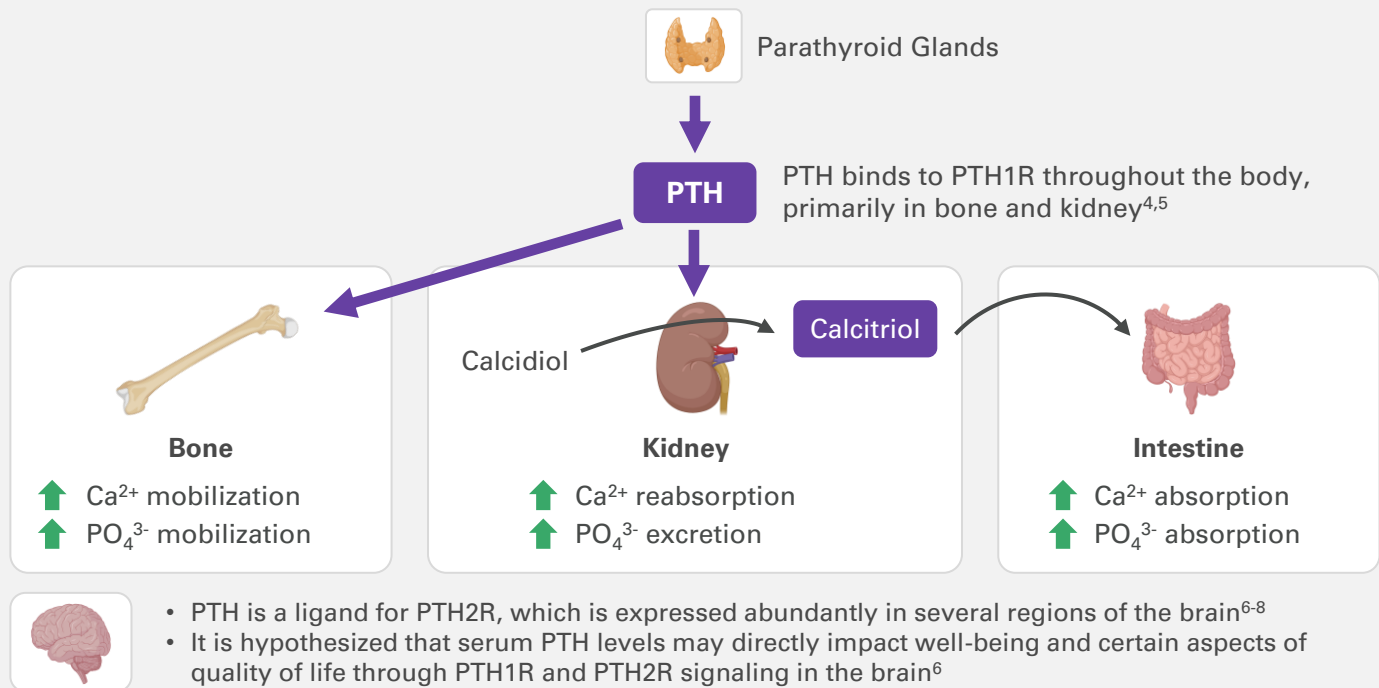


# Hypoparathyroidism

## Parathyroid Hormone (PTH) Physiology

PTH is the primary regulator of serum calcium and phosphate balance, acting directly on bone and kidney, and indirectly on the intestine<sup>1-3</sup>



## Hypoparathyroidism Introduction

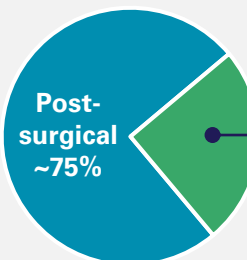
Hypoparathyroidism is an endocrine disease caused by insufficient levels of PTH<sup>9</sup>

### Prevalence

United States:  
~77,000 to  
115,000 people<sup>10,11</sup>

Europe:  
~3.2 in 10,000  
people<sup>12-15</sup>

### Etiology<sup>2,10</sup>



Other:

- Autoimmune
- Genetic
- Idiopathic

### Diagnosis

Hypoparathyroidism is diagnosed when serum PTH levels are low or insufficient in the presence of hypocalcemia, confirmed twice at least 2 weeks apart.<sup>1,16</sup> Elevated serum phosphate, reduced calcitriol, and elevated urinary FECa support diagnosis.<sup>2,16</sup> Hypoparathyroidism may be considered chronic if it persists > 6 months after surgery<sup>1,17-18</sup>

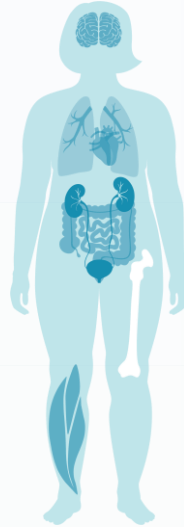
**Abbreviations:**  $\text{Ca}^{2+}$ , ionized calcium; FECa, fractional excretion of calcium;  $\text{PO}_4^{3-}$ , orthophosphate; PTH1R, PTH 1 Receptor; PTH2R, PTH 2 Receptor

**References:** 1. Brandi ML, et al. *J Clin Endocrinol Metab.* 2016; 2. Mannstadt M, et al. *Nat Rev Dis Primers.* 2017; 3. Shoback D.. *New England Journal of Medicine.* 2008; 4. Cheloha RW, et al. *Nat Rev Endocrinol.* 2015; 5. Lee M, et al. *Curr Opin Nephrol Hypertens.* 2009; 6. Dettori C, et al. *Pers Med.* 2023; 7. Bago AG, et al. *Neuroscience.* 2009; 8. Usdin TB, et al. *J Biol Chem.* 1995; 9. Shoback DM, et al. *Clin Endocrinol Metab.* 2016; 10. Clarke BL, et al. *J Clin Endocrinol Metab.* 2016; 11. Powers J, et al. *J Bone Miner Res.* 2013; 12. Smith A., et al. *Virtual European Congress of Endocrinology* 2020; 13. Underbjerg L, et al. *J Bone Miner Res.* 2015; 14. Cianferotti L, et al. *Calcif Tissue Int.* 2018; 15. Vadiveloo T, et al. *J Bone Miner Res.* 2018; 16. Khan AA, et al. *J Bone Miner Res.* 2022; 17. Bollerslev J, et al. *Eur J Endocrinol.* 2022; 18. Khan AA, et al. *Eur J Endocrinol.* 2019. November 2025, MED-US-TC-PTH-2500131

# Hypoparathyroidism

## Clinical Presentation

Individuals with hypoparathyroidism may experience a range of severe and potentially life-threatening short-term and long-term complications <sup>1-11</sup>			
<b>Neuro-psychiatric</b>	Anxiety & Depression, Cognitive Impairment ("Brain Fog")	Cataracts, Papilledema	<b>Ophthalmological</b>
<b>CNS</b>	Seizures, Basal Ganglia Calcifications, Parkinsonism or Dystonia	Altered Tooth Morphology	<b>Dental</b>
<b>Renal<sup>a</sup></b>	Nephrocalcinosis, Nephrolithiasis, Chronic Kidney Disease	Vascular Calcifications, Cardiac Arrhythmias, Dilated Cardiomyopathy	<b>Cardiovascular</b>
<b>PNS</b>	Paresthesia, Muscle Cramps, Pain, Tetany	Laryngospasm, Bronchospasms	<b>Respiratory</b>
<b>Derm-atological</b>	Dry skin, Brittle Nails, Thinning Hair	Myopathy, Spondyloarthropathy	<b>Musculoskeletal</b>



The burden of hypoparathyroidism negatively impacts HRQoL, irrespective of serum calcium levels, as well as physical functioning and psychological well-being<sup>12,13</sup>

## Management of Hypoparathyroidism

### Conventional Therapy (Active Vitamin D and Calcium) for Hypoparathyroidism

- Conventional therapy aims to alleviate hypocalcemia, but does not address insufficient PTH levels<sup>14</sup>
- High doses of active vitamin D and calcium may lead to hypercalciuria and predispose individuals with hypoparathyroidism to nephrolithiasis, nephrocalcinosis, and the development of chronic kidney disease<sup>2,9</sup>
- Individuals with hypoparathyroidism receiving conventional therapy may still report reduced QoL and experience impaired physical functioning and well-being<sup>8,15,16</sup>

### PTH Therapy Considerations from the 2022 Guidelines from the Second International Workshop

- Consider the use of PTH when individuals with hypoparathyroidism are inadequately controlled with conventional therapy. Inadequate control of hypoparathyroidism is considered any one of the following: symptomatic hypocalcemia, hyperphosphatemia, renal insufficiency, hypercalciuria, or poor QoL<sup>17</sup>
- Individuals with hypoparathyroidism with poor compliance, malabsorption, or intolerance of large doses of active vitamin D and calcium may benefit from PTH therapy<sup>17</sup>

<sup>a</sup>Renal complications occurring in hypoparathyroidism are primarily attributed to use of conventional therapy rather than the disease itself<sup>3</sup>

**Abbreviations:** CNS, central nervous system; PNS, peripheral nervous system; PTH, parathyroid hormone; HRQoL, health-related quality of life

**References:** 1. Shoback DM, et al. *Clin Endocrinol Metab.* 2016; 2. Brandi ML, et al. *J Clin Endocrinol Metab.* 2016; 3. Mannstadt M, et al. *Nat Rev Dis Primers.* 2017; 4. Brod M, et al. *Patient.* 2020; 5. Rubin MR, et al. *J Endocr Soc.* 2022; 6. Underbjerg L, et al. *J Bone Miner Res.* 2015; 7. Bilezikian JP, et al. *J Bone Miner Res.* 2011; 8. Hadker N, et al. *Endocr Pract.* 2014; 9. Rubin MR. *F1000Res.* 2020; 10. Underbjerg L, *J Bone Miner Res.* 2013; 11. Underbjerg L, et al. *J Bone Miner Res.* 2014; 12. Kontogeorgos G, et al. *Endocr Connect.* Jan 10 2022;11(1). 13. Brod M, et al. *Life Res.* Jan 2021;30(1):277-291. 14. Khan AA, et al. *Eur J Endocrinol.* 2019. 15. Büttner M, et al. *Endocrine.* 2017; 16. Bjornsdottir S, et al. *J Bone Miner Res.* 2022. 17. Khan AA, et al. *J Bone Miner Res.* 2022