POLIS V12 and the Tensional Approach to Major Medical Problems

Version 1.1 – Extended with Nineteen Conditions

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Abstract

Classical medicine describes mechanisms at molecular, cellular and systemic levels but rarely provides a unified causal ontology for why a disease appears, progresses or remits. POLIS V12, a fully closed tensional conservation theory, models every system as a polis composed of three meshes (solid, liquid, gaseous). All real systems satisfy the closure condition $\varepsilon = \sum K_m(2 + K_m) = 0$, and their state is quantified by the disequilibrium index $\mathrm{IDT}^* \in [0, 1)$. This paper extends the previous analysis (version 1.0, seven conditions) to nineteen medical problems, adding infectious diseases, metabolic syndrome, cardiovascular diseases, respiratory diseases, renal failure, hepatic failure, hematologic diseases, endocrine disorders, psychiatric conditions, sleep disorders, developmental disorders, and accelerated aging syndromes. For each condition, the affected meshes are identified, pathological observations are reinterpreted in terms of K_m anomalies and phase transitions, and therapeutic strategies derived from restoring tensional equilibrium are proposed. The RMCE cycle (Reception, Memorisation, Comparison, Execution) models immune discrimination, neural processing and cellular signalling. Explicit falsification criteria are given for each application. No clinical data are fabricated.

Contents

1 Introduction

POLIS V12 provides a unified causal framework for medicine. A human being is a polis with three meshes:

- **Solid mesh**: bones, fixed organs, DNA, cytoskeleton, extracellular matrix.
- **Liquid mesh**: blood, lymph, interstitial fluid, synaptic transmitters.
- **Gaseous mesh**: breath, metabolic gases, thermal dissipation, symbolic activity.

All deviations from equilibrium are expressed by:

$$\varepsilon = \sum_m K_m(2 + K_m) = 0, \qquad \mathrm{IDT}^* = \frac{\sum x_m}{1 + \sum x_m}, \qquad x_m = K_m(2 + K_m)$$

where $K_m = (v_m - T)/(v_{\max} - T) \in [0, 1]$ and $T = K_{\min}$. For all real systems, $\mathrm{IDT}^* \approx 0.85$ (Phase 4). A disease is a local or global deviation from this pattern, often a shift to Phase 3 (saturation) or Phase 4 (explosive rupture without closure).

2 Cancer as an Uncontrolled Phase 4 Explosion

Affected mesh: solid (nuclear architecture), liquid (signalling), gaseous (metabolic waste).

Cancer arises when a mutation increases local K_m of the solid mesh beyond the reversible limit, losing Phase 5 capacity. Tissue IDT^* rises as outlier cells dominate $\sum x_m$.

Strategy: restore apoptotic pathways (lower K_{nuclear}), re-establish contact inhibition (increase $VT = K - T$), use metronomic stressors to induce Phase 5.

Falsification: If a tumour with high IDT^* shows no reduction after a tensional intervention, the application is falsified.

3 Autoimmune Diseases as Liquid Mesh Confusion

Affected mesh: liquid (immune system, cytokines).

RMCE Comparison threshold shifts: K_{self} is misread as $K_{\mathrm{non-self}}$. Liquid mesh accumulates high IDT^*; chronic inflammation persists.

Strategy: tolerogenic dendritic cells (low VT signals), modulate immune receptor sampling, vagus nerve stimulation (Phase 5).

Falsification: No change in serum cytokine IDT^* after tensional protocol $\Rightarrow$ falsified.

4 Neurodegeneration as Loss of Solid Mesh Coherence

Affected mesh: solid (synaptic architecture, protein aggregates), liquid (CSF).

Misfolded proteins are high-K_m tensional traps. Glymphatic liquid mesh cannot flush them. Local x_m rises; neurons enter Phase 4 or Phase 7.

Strategy: slow-wave sleep (Phase 5), rhythmic sensory stimulation (uniform VT), intermittent fasting (lower solid mesh K_m).

Falsification: No correlation between sleep EEG coherence and amyloid-beta clearance $\Rightarrow$ falsified.

5 Aging as Accumulation of Tensional Residuals

Affected mesh: all three.

Global IDT* increases monotonically. Death occurs when the gaseous mesh can no longer sustain VT exchange.

Strategy: exercise (liquid mesh flow), caloric restriction (lower K_m base), senolytics (remove high-K_m cells).

Falsification: No monotonic increase in tensional ageing biomarker with age $\Rightarrow$ falsified.

6 Genetic Disorders as Anomalous K_m in DNA

Affected mesh: solid (DNA, chromatin).

Mutations change local K_m. Non-coding DNA is a tensional reservoir that buffers small variations.

Strategy: epigenetic modulation (liquid mesh), tensional chaperones (lower mutant protein K_m).

Falsification: No compensation from any epigenetic modifier $\Rightarrow$ falsified.

7 Chronic Pain as Trapped Tensional Residual

Affected mesh: liquid (inflammatory mediators), solid (neural plasticity).

RMCE is stuck in danger-comparison. VT along pain pathways remains high; Phase 5 (extinction) is blocked.

Strategy: graded motor imagery (Phase 5 retraining), neuromodulation (external VT).

Falsification: No reduction in brain network IDT* (fMRI) after rehabilitation $\Rightarrow$ falsified.

8 Organ Failure as Loss of Tensional Hierarchy

Affected mesh: solid (fibrosis, loss of differentiated cells), liquid (perfusion).

Fibrotic tissue (high K_m, low function) replaces normal tissue; organ IDT* rises.

Strategy: regenerative medicine (reprogramme to low K_m seed state), decellularised matrices.

Falsification: No transient IDT* decrease during organ regeneration $\Rightarrow$ falsified.

9 Infectious Diseases

Affected mesh: liquid (immune system); external polis (pathogen).

The pathogen is an external polis invading the host. Chronic infection occurs when the pathogen's K_m is close enough to K_{self} to escape RMCE comparison, or when the liquid mesh is saturated (Phase 3). Antibiotic resistance is an increase in the pathogen's solid mesh K_m (cell wall, enzymes) that neutralises the drug's VT.

Strategy: design molecules that increase VT between pathogen and immune system (vaccines, monoclonal antibodies); phage therapy.

Falsification: High-K_m resistant pathogen shows no increased clearance when VT is augmented $\Rightarrow$ falsified.

10 Metabolic Diseases (Type 2 Diabetes, Obesity, Metabolic Syndrome)

Affected mesh: liquid (insulin, glucose, lipids), solid (adipose tissue, muscle, liver).

Insulin resistance means target tissues have reduced K_m for insulin. Obesity is excessive storage of K_m in adipose tissue as buffer. Type 2 diabetes is failure of the liquid mesh to maintain $\varepsilon = 0$.

Strategy: diet (reduce K_m input), exercise (increase VT in muscle), metformin (lower hepatic K_m), bariatric surgery (Phase 5 reorganisation).

Falsification: High-IDT* diabetic shows no improvement after tensional lifestyle intervention $\Rightarrow$ falsified.

11 Cardiovascular Diseases

Affected mesh: solid (vessel wall, plaque, thrombus), liquid (blood flow).

Atherosclerosis is abnormal solid mesh accumulation inside arterial walls. Plaque rupture (Phase 4) causes thrombosis – a solid mesh aggregate that blocks VT to downstream tissues. Infarction or stroke is ε-failure in that territory.

Strategy: statins (lower K_m of lipid synthesis), antiplatelet agents (reduce solid mesh aggregation), reperfusion (restore VT).

Falsification: IDT* of coronary plaque does not correlate with rupture risk $\Rightarrow$ falsified.

12 Respiratory Diseases

Affected mesh: gaseous (airways, alveoli), liquid (smooth muscle, oedema).

Asthma: liquid mesh contracts excessively (Phase 3), reducing air VT. COPD: solid mesh (alveoli) destroyed, losing K_m for gas exchange. Fibrosis: rigid solid mesh (high K_m) prevents expansion.

Strategy: bronchodilators (relax liquid mesh), corticosteroids (reduce inflammation, restore VT), oxygen therapy (external VT).

Falsification: COPD IDT* from pulmonary function tests does not improve with rehabilitation $\Rightarrow$ falsified.

13 Renal Failure

Affected mesh: solid (nephrons), liquid (blood, filtrate).

The kidney filters the liquid mesh, removing residuals x_m. Failure occurs when the solid mesh loses the ability to regulate plasma K_m. Retained urea and creatinine increase systemic ε. Dialysis is an external solid mesh that substitutes function.

Strategy: control blood pressure (reduce harmful VT), avoid nephrotoxins, transplant (replace solid mesh).

Falsification: IDT* of dialysis patient does not decrease with optimised treatment $\Rightarrow$ falsified.

14 Hepatic Failure

Affected mesh: solid (hepatocytes, fibrous tissue), liquid (portal circulation).

Cirrhosis replaces functional solid mesh with fibrous tissue (high K_m, low function). Detoxification is compromised; systemic ε fails closure. Hepatic encephalopathy is intoxication of the cerebral gaseous mesh.

Strategy: avoid hepatotoxins, treat viral hepatitis (reduce inflammatory K_m), transplant (replace solid mesh).

Falsification: Cirrhosis IDT* does not predict decompensation $\Rightarrow$ falsified.

15 Hematologic Diseases

Affected mesh: liquid (blood), solid (bone marrow).

Anaemia: low K_m of erythrocytes (haemoglobin, oxygen-carrying capacity). Leukaemia: Phase 4 of the haematopoietic lineage – uncontrolled proliferation of immature cells (high K_m) that overwhelm the marrow.

Strategy: transfusions (restore K_m), chemotherapy (reduce leukaemic K_m), bone marrow transplant.

Falsification: IDT* of leukaemia patient does not correlate with blast percentage $\Rightarrow$ falsified.

16 Endocrine Disorders

Affected mesh: liquid (hormones), solid (glands).

Endocrine glands are nodes of the liquid mesh that secrete hormones – VT messengers. Hypothyroidism: low K_m of T3/T4 (slow metabolism). Hyperthyroidism: excess VT (acceleration). Feedback loops (hypothalamus–pituitary) are RMCE cycles.

Strategy: hormone replacement (normalise K_m), antithyroid drugs (reduce excessive VT), surgery (remove hyperactive node).

Falsification: IDT* of hormone panels does not track clinical severity $\Rightarrow$ falsified.

17 Psychiatric Disorders

Affected mesh: gaseous (thoughts, emotions), liquid (neurotransmitters).

Depression: high IDT* but low VT – polis stuck in Phase 3 (negative saturation). Anxiety: excessive anticipatory VT (gaseous mesh reads future as threat). Schizophrenia: gaseous mesh generates patterns without solid mesh correspondence – RMCE fails at comparison.

Bipolar disorder: alternation between Phase 3 (depression) and Phase 4 (mania – explosive VT).

Strategy: drugs modulate K_m of neurotransmitters (liquid mesh); cognitive-behavioural therapy trains RMCE (restructure comparison); sleep (Phase 5) is essential.

Falsification: Brain network IDT* (fMRI) does not change after effective treatment $\Rightarrow$ falsified.

18 Sleep Disorders

Affected mesh: gaseous (breathing, brain activity), liquid (homeostatic drive).

Sleep is Phase 5 of the human polis. Insomnia: inability to enter Phase 5 – gaseous mesh remains active. Apnoea: obstruction of the respiratory gaseous mesh, causing micro-arousals. Narcolepsy: abrupt, poorly controlled transition to Phase 5 (REM invasion).

Strategy: sleep hygiene (reduce stimulating K_m), CPAP (clear respiratory gaseous mesh), wake-promoting agents (synchronise daytime K_m).

Falsification: Sleep apnoea patient shows no improvement in daytime IDT* after CPAP $\Rightarrow$ falsified.

19 Developmental Disorders (Autism Spectrum, ADHD)

Affected mesh: gaseous (sensory integration), liquid (attention, social cognition).

Autism: differences in sensory integration (gaseous mesh) and social RMCE comparison. ADHD: difficulty sustaining VT – attention disperses rapidly.

Strategy: behavioural therapy (train RMCE), environmental structure (reduce K_m of distractors), medication (modulate dopaminergic liquid mesh).

Falsification: IDT* of ADHD child does not decrease with effective treatment $\Rightarrow$ falsified.

20 Accelerated Aging Syndromes (Progeria)

Affected mesh: all three, predominantly solid (DNA, proteins).

Global IDT* increases much faster than normal. Solid mesh accumulates lesions at high speed. Phase 5 (reorganisation) is ineffective. Lifespan is the integral of ε until polis failure.

Strategy: senolytics and antioxidants (slow K_m accumulation), though no cure exists at this stage.

Falsification: IDT* (derived from epigenetic clock) does not correlate with disease severity $\Rightarrow$ falsified.

21 Common Protocol for Tensional Diagnosis and Intervention

For any medical condition:

1. Define the relevant polis (cell, tissue, organ, immune network, whole person).
2. Collect clinically measurable variables.
3. Set $T = K_{\min}$ from the dataset.
4. Normalise: $K_m = (v - T)/(v_{\max} - T)$.
5. Compute $x_m = K_m(2 + K_m)$ and $\varepsilon = \sum x_m$.
6. Compute IDT$^* = \varepsilon/(1 + \varepsilon)$.
7. Determine tensional phase.
8. Design an intervention to reduce IDT*.
9. Monitor over time. If IDT* has not decreased after a pre-specified period, the intervention is falsified.

22 Synthesis Table of Nineteen Conditions

Table 1: Summary of the nineteen medical conditions within POLIS V12.

Condition	**Affected mesh**	**Phase**	**Falsification condition**
Cancer	Solid (primary)	Phase 4 stuck	No IDT* reduction after tensional intervention
Autoimmune diseases	Liquid	Phase 4 loop	No cytokine IDT* change after protocol
Neurodegeneration	Solid + Liquid	Phase 7	No sleep EEG / amyloid correlation

Condition	**Affected mesh**	**Phase**	**Falsification condition**
Aging	All three	Phase 7 (gradual)	No monotonic IDT* increase with age
Genetic disorders	Solid (DNA)	Phase 3/4	No epigenetic compensation effect
Chronic pain	Liquid + Solid	Phase 3 stuck	No brain IDT* reduction after rehab
Organ failure	Solid + Liquid	Phase 7	No IDT* decrease during regeneration
Infectious diseases	Liquid + external polis	Phase 3/4	High-K_m pathogen not cleared by augmented VT
Metabolic syndrome	Liquid + Solid	Phase 3	No IDT* improvement after lifestyle change
Cardiovascular diseases	Solid + Liquid	Phase 4 (rupture)	Plaque IDT* does not predict rupture risk
Respiratory diseases	Gaseous + Liquid	Phase 3/4	No IDT* improvement with rehabilitation
Renal failure	Solid + Liquid	Phase 7	No IDT* decrease with optimal treatment
Hepatic failure	Solid + Liquid	Phase 7	IDT* does not predict decompensation
Hematologic diseases	Liquid + Solid	Phase 4	IDT* does not correlate with blast percentage
Endocrine disorders	Liquid + Solid	Phase 3/4	Hormone IDT* does not track clinical severity
Psychiatric disorders	Gaseous + Liquid	Phase 3/4	Brain network IDT* unchanged after treatment
Sleep disorders	Gaseous + Liquid	Phase 5 blocked	No daytime IDT* improvement after CPAP
Developmental disorders	Gaseous + Liquid	Phase 2 anomaly	IDT* unchanged after effective treatment
Accelerated aging	All three	Phase 7 (rapid)	IDT* does not correlate with disease severity

23 Conclusion

Nineteen medical conditions are reinterpreted as deviations from the closure condition $\varepsilon = \sum K_m(2 + K_m) = 0$, with specific mesh identification, phase transition analysis, and falsifiable therapeutic strategies. The POLIS V12 framework does not replace molecular medicine but complements it with a causal structure that classical reductionism lacks. Future work will develop quantitative K_m and IDT* biomarkers for clinical use.

Data Availability

Zenodo DOI: 10.5281/zenodo.19618276 (main treatise) and 10.5281/zenodo.20075257 (version 1.0).

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