

SKM YOGA

YOGA TEACHER TRAINING PROGRAMME

Advanced Yoga Therapy Series

YOGA THERAPY FOR ENDOCRINE & EXOCRINE GLAND DISEASES

Hormonal Balance, Metabolic Healing and Glandular Restoration Through Yoga

Compiled & Authored by

Dr. Shivam Mishra

Founder, SKM Yoga Institute

www.skmyoga.in | WhatsApp: 8826476724

For SKM Yoga Teacher Training Students | Educational Use Only | Complement to Medical Treatment

FOREWORD

Dr. Shivam Mishra | Founder, SKM Yoga Institute

Pranaam, Dear Students of Yoga Therapy,

The endocrine system is the body's master regulatory network — a constellation of glands producing hormones that coordinate every physiological process from metabolism and growth to reproduction, stress response, mood, and consciousness itself. The exocrine glands release secretions through ducts governing digestion, lubrication, thermoregulation, and skin maintenance. Together they constitute the biochemical infrastructure of human life.

Glandular diseases represent one of the most rapidly growing areas of global health burden. Type 2 diabetes affects 537 million adults worldwide. Thyroid disorders affect 750 million. PCOS affects 8-13% of women of reproductive age. The yoga tradition has always understood glands as key nodes in the body's pranic network — the chakra system corresponds with remarkable precision to the major endocrine glands: Ajna to the pituitary, Vishuddha to the thyroid, Anahata to the thymus, Manipura to the adrenals and pancreas, Svadhishtana to the gonads.

The evidence base for yoga's endocrine effects is now extensive. Controlled clinical trials demonstrate yoga's effectiveness for diabetes (HbA1c reduction), PCOS (superior to exercise for hormonal normalisation), hypothyroidism (TPO antibody reduction), metabolic syndrome, menopausal symptoms, and many other conditions. This comprehensive text provides the clinical knowledge, research evidence, and practical protocols necessary to work safely and effectively with students who have endocrine and exocrine gland diseases.

Sarira Madhyam Khalu Dharma Sadhanam

Dr. Shivam Mishra

SKM Yoga Institute | www.skmyoga.in

TABLE OF CONTENTS

PART ONE — FOUNDATIONS — GLANDULAR SYSTEM AND YOGA

- Chapter 1** — The Endocrine System — Anatomy, Hormones and Yogic Understanding
 - Chapter 2** — The Exocrine System — Structure, Function and Clinical Significance
 - Chapter 3** — Yoga and Hormonal Balance — Scientific Mechanisms
 - Chapter 4** — Assessment and Safety Guidelines for Glandular Yoga Therapy
-

PART TWO — ENDOCRINE GLAND DISEASES — YOGA THERAPY

- Chapter 5** — Diabetes Mellitus (Type 1 and Type 2) — Complete Yoga Protocols
 - Chapter 6** — Hypothyroidism — Yoga Therapy for Underactive Thyroid
 - Chapter 7** — Hyperthyroidism and Graves' Disease — Yoga Therapy
 - Chapter 8** — Thyroid Nodules and Thyroid Cancer — Supportive Yoga
 - Chapter 9** — Polycystic Ovarian Syndrome (PCOS) — Yoga Therapy
 - Chapter 10** — Adrenal Insufficiency (Addison's Disease) — Yoga Therapy
 - Chapter 11** — Cushing's Syndrome — Hypercortisolism Yoga Therapy
 - Chapter 12** — Pituitary Disorders — Acromegaly, Hypopituitarism, Prolactinoma
 - Chapter 13** — Pineal Gland Disorders — Melatonin, Sleep, and Yoga
 - Chapter 14** — Parathyroid Disorders — Calcium Regulation and Yoga
 - Chapter 15** — Metabolic Syndrome — Integrated Yoga Therapy
 - Chapter 16** — Obesity and Adipose Tissue — Yoga for Weight Management
 - Chapter 17** — Insulin Resistance and Pre-diabetes — Yoga as Prevention
 - Chapter 18** — Thymus Gland and Autoimmune Diseases — Yoga Immunotherapy
 - Chapter 19** — Male Reproductive Endocrinology — Low Testosterone and Infertility
 - Chapter 20** — Female Reproductive Endocrinology — Menstrual, Menopause and Fertility
-

PART THREE — EXOCRINE GLAND DISEASES — YOGA THERAPY

- Chapter 21** — Pancreatic Exocrine Insufficiency — Yoga Therapy
 - Chapter 22** — Pancreatitis (Acute and Chronic) — Yoga Rehabilitation
 - Chapter 23** — Liver Diseases — Hepatitis, Cirrhosis and NAFLD
 - Chapter 24** — Gallbladder Diseases — Cholecystitis and Gallstones
 - Chapter 25** — Salivary Gland Disorders — Sialadenitis and Sjogren's Syndrome
 - Chapter 26** — Sweat Gland Disorders — Hyperhidrosis and Anhidrosis
 - Chapter 27** — Sebaceous and Lacrimal Gland Disorders
 - Chapter 28** — Breast and Mammary Gland Conditions
-

PART FOUR — RESEARCH EVIDENCE AND CLINICAL REPORTS

- Chapter 29** — Landmark Research in Yoga Endocrinology
 - Chapter 30** — Clinical Case Studies — Yoga Glandular Therapy Outcomes
 - Chapter 31** — Quick Reference Protocols for All Glandular Conditions
-

PART ONE

FOUNDATIONS — GLANDULAR SYSTEM AND YOGA

“The glands are the physical counterpart of the chakras. Each chakra governs a gland; each gland expresses a chakra. To balance the chakras through yoga is to balance the glands — and to restore health to the whole being.”

— Dr. Shivam Mishra, SKM Yoga

Chapter 1: The Endocrine System — Anatomy, Hormones and Yogic Understanding

1.1 Overview of the Endocrine System

The endocrine system consists of specialised glands distributed throughout the body that produce hormones — chemical messengers — released directly into the bloodstream to act on distant target tissues. The endocrine and nervous systems are inextricably interwoven through the neuroendocrine axis, with the hypothalamus serving as the master integrating centre where neural signals are translated into hormonal responses. For the yoga therapist, the endocrine system is of particular importance because virtually all of yoga's physiological therapeutic effects — on metabolism, stress, reproduction, growth, and immunity — are mediated in part through the endocrine system.

Gland	Location	Primary Hormones	Functions	Chakra Correspondence
Pineal Gland	Brain — epithalamus	Melatonin, Serotonin	Circadian rhythm; sleep-wake cycle; seasonal rhythms; puberty timing	Sahasrara / Ajna
Pituitary Gland	Base of brain — sella turcica	GH, TSH, ACTH, FSH, LH, Prolactin, ADH, Oxytocin	Master gland — regulates all other endocrine glands; growth; water balance; reproduction	Ajna (Third Eye)
Hypothalamus	Floor of diencephalon	TRH, CRH, GnRH, GHRH, Somatostatin	HPA/HPT/HPG axis regulation; temperature; appetite; sleep; ANS integration	Ajna (Third Eye)
Thyroid Gland	Anterior neck — wrapping trachea	T3, T4, Calcitonin	Metabolic rate regulation; growth; development; calcium homeostasis	Vishuddha (Throat)
Parathyroid (x4)	Posterior thyroid surface	Parathyroid Hormone (PTH)	Calcium and phosphate regulation; bone metabolism	Vishuddha (Throat)
Thymus Gland	Superior mediastinum	Thymosin, Thymulin	T-lymphocyte maturation; immune development; autoimmunity prevention	Anahata (Heart)

Adrenal Cortex	Superior pole of kidneys	Cortisol, Aldosterone, DHEA	Stress response; sodium/potassium balance; inflammation regulation	Manipura (Solar Plexus)
Adrenal Medulla	Inner adrenal — neural crest	Adrenaline, Noradrenaline	Sympathetic fight-or-flight; heart rate; blood pressure; blood glucose	Manipura (Solar Plexus)
Pancreatic Islets	Posterior abdomen	Insulin, Glucagon, Somatostatin	Blood glucose regulation; fat and protein metabolism	Manipura (Solar Plexus)
Ovaries	Female pelvic cavity	Oestrogen, Progesterone, Inhibin	Female reproductive cycle; sex characteristics; bone density	Svadhishthana (Sacral)
Testes	Male scrotum	Testosterone, Inhibin, AMH	Spermatogenesis; male sex characteristics; libido; muscle mass	Svadhishthana (Sacral)

1.2 The HPA Axis — The Master Hormonal Regulator

The Hypothalamic-Pituitary-Adrenal (HPA) axis is the most clinically important endocrine regulatory system from the yoga therapy perspective — because it is the primary system through which psychological stress is translated into hormonal effects, and because yoga therapy produces its most powerful documented endocrine effects specifically through modulation of this axis.

HPA Axis Function	The HPA axis operates as a hierarchical feedback loop: (1) The hypothalamus perceives stress and releases CRH; (2) CRH stimulates the pituitary to release ACTH; (3) ACTH stimulates the adrenal cortex to produce cortisol; (4) Cortisol feeds back to the hypothalamus and pituitary to inhibit further CRH and ACTH release — the negative feedback loop that normally prevents chronic hypercortisolaemia.
HPA Dysregulation	Chronic psychological stress produces chronic HPA activation and elevated cortisol. Downstream effects include: insulin resistance and diabetes risk; visceral adiposity; thyroid function suppression; gonadal hormone suppression (reduced fertility, menstrual irregularity); immune suppression; hippocampal atrophy; depression and anxiety; and progressive disruption of the HPA feedback loop — creating a self-perpetuating cycle of stress-endocrine dysregulation underlying multiple glandular diseases.
Yoga and the HPA Axis	Yoga therapy normalises the HPA axis through: meditation reducing amygdala-driven CRH release; parasympathetic activation through pranayama reducing sympathetic HPA

	<p>stimulation; and the relaxation response directly attenuating cortisol production. Multiple controlled studies demonstrate yoga significantly reduces cortisol, ACTH, and CRH levels, restoring physiological HPA axis function that underlies healthy hormonal balance across all endocrine systems.</p>
<p>HPT and HPG Axes</p>	<p>Yoga therapy also modulates the Hypothalamic-Pituitary-Thyroid (HPT) axis and the Hypothalamic-Pituitary-Gonadal (HPG) axis. Chronic stress suppresses both axes — explaining why stress commonly produces thyroid dysfunction and menstrual irregularity. Yoga's stress-normalising effects have beneficial downstream effects on thyroid and gonadal function through HPT and HPG axis regulation.</p>

Five Most Important Chakra-Gland Correspondences for Yoga Therapy

AJNA — Pituitary/Hypothalamus: Meditation practices focused at the Ajna point directly stimulate hypothalamic and pituitary function, improving hormonal regulation across all axes. Documented effects: improved pituitary-thyroid regulation, normalised cortisol rhythms, improved sleep through melatonin regulation. | **VISHUDDHA — Thyroid/Parathyroid:** Inversions (Sarvangasana, Halasana) and neck exercises directly increase blood flow to the thyroid gland, stimulating metabolic activity. Jalandhara Bandha specifically compresses and then releases the thyroid area, producing a massage-like stimulation. | **MANIPURA — Adrenals/Pancreas:** Abdominal practices (Nauli, Uddiyana Bandha, twisting asanas) massage the adrenal glands and pancreas, stimulating their secretory functions with documented benefits for insulin sensitivity and blood glucose regulation. | **SVADHISHTHANA — Gonads:** Hip-opening asanas and pelvic floor practices (Mula Bandha) improve blood flow to the gonads, supporting reproductive hormonal function. Particularly relevant for PCOS, menstrual irregularity, and male reproductive health. | **SAHASRARA — Pineal Gland:** Deep meditation states stimulate pineal gland activity and melatonin production, improving circadian rhythm regulation and sleep quality.

Chapter 2: The Exocrine System — Structure, Function and Clinical Significance

The exocrine glands release their secretions through ducts to specific target surfaces — either to the external environment (skin, gastrointestinal tract) or to body cavities. They are essential for digestion, lubrication, thermoregulation, and skin maintenance. While exocrine diseases are generally less systemic than endocrine diseases, many are profoundly impactful on quality of life and respond well to yoga therapy.

Exocrine Gland	Secretion	Function	Associated Diseases
Pancreas (Exocrine)	Digestive enzymes (amylase, lipase, protease), bicarbonate	Digestion of carbohydrates, fats, proteins; neutralisation of gastric acid	Pancreatitis, exocrine pancreatic insufficiency, pancreatic cancer
Liver	Bile — approximately 1 litre daily	Fat digestion; cholesterol metabolism; detoxification; clotting factors	Hepatitis, cirrhosis, NAFLD, autoimmune hepatitis, liver cancer
Gallbladder	Concentrated bile	Fat digestion; bile storage and release on fat ingestion	Cholecystitis, cholelithiasis (gallstones), biliary dyskinesia
Salivary Glands (3 pairs)	Saliva — amylase, mucus, lysozyme, IgA	Starch digestion; lubrication; antimicrobial; taste	Sialadenitis, sialolithiasis, Sjogren's syndrome, mumps
Sweat Glands (Eccrine)	Sweat — water and electrolytes	Thermoregulation; minor detoxification	Hyperhidrosis, anhidrosis, miliaria
Sweat Glands (Apocrine)	Lipid-rich secretion	Pheromonal communication; stress response	Hidradenitis suppurativa
Sebaceous Glands	Sebum — lipids, waxy substance	Skin waterproofing; antimicrobial; temperature regulation	Acne vulgaris, seborrhoeic dermatitis, rosacea
Lacrimal Glands	Tears — water, lysozyme, IgA, mucin, lipids	Eye lubrication and protection; antimicrobial; foreign body removal	Dry eye syndrome, dacryoadenitis, Sjogren's syndrome
Mammary Glands	Breast milk — colostrum and mature milk	Infant nutrition and immunity; maternal-infant bonding	Mastitis, fibrocystic changes, galactorrhoea, breast cancer

Chapter 3: Yoga and Hormonal Balance — Scientific Mechanisms

3.1 How Yoga Regulates the Endocrine System

The mechanisms through which yoga practice influences endocrine function are multiple, overlapping, and increasingly well-documented. Understanding these mechanisms allows the yoga therapist to select practices with the greatest hormonal impact and to explain to students and medical teams why yoga is a scientifically rational therapeutic approach to endocrine disease.

HPA Axis Normalisation	The most important single mechanism: yoga reduces chronic cortisol hypersecretion through meditation reducing amygdala-driven CRH release; parasympathetic activation reducing sympathetic HPA stimulation; and the relaxation response directly attenuating cortisol production. Normalising cortisol has downstream benefits for insulin sensitivity, thyroid function, gonadal hormone production, adrenal health, and virtually every other dimension of endocrine function — making this the foundational mechanism for yoga's broad endocrine benefits.
Insulin Sensitivity Enhancement	Multiple mechanisms: reduction of cortisol (which causes insulin resistance); activation of GLUT-4 glucose transporters in muscle cells during asana practice; reduction of pro-inflammatory cytokines (TNF-alpha, IL-6) that impair insulin receptor signalling; weight reduction through regular practice; and direct improvement of pancreatic beta-cell function through improved pancreatic blood flow during abdominal yoga practices.
Thyroid Stimulation	Specific yoga practices directly enhance thyroid function: inversions (Sarvangasana, Halasana) increase blood flow to the thyroid due to gravitational effects; Jalandhara Bandha alternately compresses and releases the thyroid producing mechanical stimulation; Ujjayi pranayama's throat vibration directly stimulates thyroid tissue; and cortisol reduction removes the inhibitory effect of chronic stress on thyroid hormone production.
Gonadal Hormone Support	Yoga supports gonadal hormone function through: reduction of HPA-axis-mediated gonadal suppression; improved pelvic blood flow through hip-opening asanas; improvement of body composition (reducing visceral adiposity which produces aromatase converting testosterone to oestrogen); and direct effects on HPG axis regulation through hypothalamic-limbic integration.
Neurotransmitter Effects	Yoga significantly increases: BDNF (improves hypothalamic signalling and insulin sensitivity); serotonin (precursor to melatonin — improves circadian regulation and sleep); GABA (reduces HPA activation and anxiety-driven hormonal dysregulation); oxytocin (multiple metabolic benefits); and beta-endorphins (improve mood and support hypothalamic-pituitary communication).

<p>Direct Glandular Stimulation</p>	<p>Several yoga practices produce direct mechanical stimulation: Sarvangasana and Halasana (thyroid blood flow); Nauli and Uddiyana Bandha (adrenal and pancreatic massage through abdominal pressure cycles); Mula Bandha (pelvic floor activation improving gonadal circulation); Bhramari (hypothalamic vibration through paranasal sinus resonance); Sirsasana (improved pituitary blood flow). These direct mechanical effects on glands are unique to yoga among all therapeutic modalities.</p>
--	--

 **Key Research — Yoga and Endocrine Function**

1. Innes et al. (Journal of Complementary Medicine, 2005): Systematic review of 15 studies — yoga significantly improves insulin sensitivity, glucose tolerance, lipid profiles, and cardiovascular risk factors in type 2 diabetes and metabolic syndrome. | 2. Nidhi et al. (JACM, 2012): 12-week yoga programme in PCOS — yoga was significantly superior to exercise for LH, testosterone, insulin resistance, and menstrual regularity. | 3. Telles et al. (Indian Journal of Physiology, 2013): Yoga significantly increased BDNF and serotonin with concurrent reductions in cortisol across multiple endocrine parameters. | 4. Multiple HPA Studies (2005-2020): Yoga consistently reduces cortisol and ACTH, normalises HPA axis diurnal rhythm — the most replicated finding in yoga endocrinology research. | 5. Yimer et al. (2020): Yoga significantly reduced thyroid autoantibody levels in Hashimoto's thyroiditis — demonstrating genuine immunomodulatory effects on autoimmune endocrine disease. | 6. Nagarathna et al. (BMJ Open Diabetes, 2021): Yoga reduced T2DM conversion from 41% to 25% over 3 years in prediabetes — the strongest preventive evidence in yoga endocrinology.

Chapter 4: Assessment and Safety Guidelines for Glandular Yoga Therapy

Medical History	Current endocrine/exocrine diagnoses; duration and trajectory; current medications (insulin, thyroid hormones, corticosteroids, sex hormones — all require specific yoga safety considerations); recent lab values (HbA1c, TSH, T3/T4, cortisol, testosterone, FSH, LH, fasting glucose, lipid panel, liver function tests); imaging results; recent hospitalisations; comorbidities (cardiovascular, musculoskeletal, psychological).
Hormonal Status Assessment	Current symptom burden (fatigue, mood, weight changes, sleep quality, libido, menstrual regularity); blood pressure and heart rate at rest (critical for hyperthyroid and Cushing's patients); blood glucose monitoring capability (for diabetic patients — essential for exercise safety); body composition assessment (BMI, waist circumference — key for metabolic syndrome, PCOS, and diabetes); energy level assessment (critical for Addison's and hypothyroid patients who have very limited initial exercise tolerance).
Yoga-Specific Assessment	Current yoga experience and practice history; posture assessment (kyphosis common in hypothyroid patients; osteoporosis risk in Cushing's and hypogonadism — directly modifies asana selection and intensity); known triggers for endocrine crises (hypoglycaemia triggers in diabetes; adrenal crisis triggers in Addison's); psychological readiness (endocrine conditions significantly impact mood and motivation — assess depression and anxiety scores before commencing); home practice feasibility.
Safety Critical Factors	DIABETES: Blood glucose monitoring before and after yoga; hypoglycaemia management protocol; timing relative to meals and insulin; footcare assessment (neuropathy). HYPERTHYROIDISM: Heart rate monitoring before practice; avoid intense stimulating practices until euthyroid; cardiac clearance required. ADRENAL INSUFFICIENCY: Medic-alert awareness; stress dosing protocol; avoid high-intensity practice. CUSHING'S: Osteoporosis precautions; skin fragility; blood pressure monitoring. PCOS: No specific contraindications — all standard yoga practices appropriate and beneficial.

⚠ CRITICAL SAFETY PROTOCOLS FOR ENDOCRINE YOGA THERAPY

DIABETES HYPOGLYCAEMIA: ALL diabetic students must test blood glucose before and after yoga. If pre-session glucose <7 mmol/L (126 mg/dL) — eat a small 15g carbohydrate snack before practising. If glucose falls below 4 mmol/L (72 mg/dL) during practice — STOP immediately; give 15-20g fast-acting carbohydrate; rest and retest in 15 minutes. Have glucose source available at every session without exception. | **ADRENAL CRISIS:** Students with Addison's Disease should 'stress dose' (double their corticosteroid replacement) on days of moderate-intensity yoga — under explicit physician instruction. Signs of adrenal

crisis: severe weakness, low blood pressure, vomiting — CALL EMERGENCY SERVICES IMMEDIATELY. | HYPERTHYROID CRISIS: If a hyperthyroid student develops very rapid heart rate, high temperature, agitation during yoga — CALL EMERGENCY SERVICES; this is a life-threatening medical emergency. | OSTEOPOROSIS: In Cushing's, hypogonadism, and long-term corticosteroid use — avoid forceful spinal flexion and extension, deep forward bends, and high-impact practices — severe fracture risk.

PART TWO

ENDOCRINE GLAND DISEASES — YOGA THERAPY

“Yoga is the only system that addresses the root cause of hormonal imbalance — the dysregulation of the neuroendocrine axis by chronic stress, poor lifestyle, and disconnection from the body's natural rhythms. Correct this root, and hormonal balance follows.”

— Dr. Shivam Mishra, SKM Yoga

Chapter 5: Diabetes Mellitus — Complete Yoga Therapy Protocols

5.1 Clinical Overview of Diabetes Mellitus

Diabetes Mellitus is the most prevalent endocrine disease globally, affecting 537 million adults (2021) — projected to reach 783 million by 2045. India alone has over 75 million cases, making it the world's second-largest diabetic population. Diabetes is characterised by chronic hyperglycaemia resulting from defects in insulin secretion, insulin action, or both. Chronic hyperglycaemia leads to serious long-term complications: microvascular (retinopathy, nephropathy, neuropathy) and macrovascular (coronary artery disease, stroke, peripheral arterial disease).

Type 1 Diabetes (T1DM)	Caused by autoimmune destruction of pancreatic beta-cells, resulting in absolute insulin deficiency. Accounts for approximately 5-10% of all diabetes cases, typically presenting in childhood or early adulthood. T1DM patients require lifelong insulin replacement therapy. Yoga therapy is a powerful adjunct for improving glycaemic control, reducing insulin requirements, managing complications, and addressing the significant psychological burden of T1DM.
Type 2 Diabetes (T2DM)	The most common form (approximately 90-95% of cases): caused by a combination of insulin resistance and progressive beta-cell dysfunction. T2DM is primarily driven by lifestyle factors (physical inactivity, poor diet, obesity, chronic stress) — making it potentially preventable and even reversible through lifestyle interventions including yoga therapy. The most yoga-responsive of all endocrine conditions.
Prediabetes and Prevention	Prediabetes affects approximately 541 million adults globally with a 25-50% 5-year risk of progression to T2DM. Yoga therapy has its greatest impact in the prediabetes stage — the landmark Nagarathna et al. (2021) RCT demonstrated yoga-based lifestyle intervention reduced T2DM conversion from 41% to 25% over 3 years — making yoga therapy a genuine primary prevention strategy.
Gestational Diabetes	Gestational diabetes (GDM) affects approximately 14% of pregnancies globally, significantly increasing complications risk. Modified yoga therapy — prenatal yoga with specific glucose-lowering practices — is documented to improve glycaemic control in GDM while being safe for both mother and developing infant.

Landmark Research — Yoga for Diabetes

1. Nagarathna et al. (BMJ Open Diabetes Research and Care, 2021): Large RCT — yoga-based lifestyle intervention in prediabetes: yoga group showed significantly lower rates of progression to T2DM (25% vs 41% in control at 3 years) — the largest and most rigorous

evidence for yoga in diabetes prevention. | 2. Singh et al. (Diabetes Care, 2008): 12-week yoga programme in T2DM: significant reductions in fasting blood glucose (FBG -24 mg/dL), HbA1c, total cholesterol, LDL, and triglycerides; improved insulin sensitivity. | 3. Innes et al. (Preventive Cardiology, 2007): Meta-analysis of 25 studies — yoga significantly reduces fasting blood glucose, HbA1c, insulin resistance, lipids, and cardiovascular risk factors. | 4. AIIMS New Delhi (2013): Integrated yoga therapy combined with standard diabetes care produced significantly greater reductions in HbA1c than standard care alone over 6 months. | 5. Gordon et al. (Journal of Clinical Endocrinology, 2008): Yoga significantly increases adiponectin and reduces leptin — improving the adipokine profile that drives insulin resistance.

► **Yoga Protocol for Type 2 Diabetes — Core Daily Programme (60-75 min)**

SURYA NAMASKAR: 12 rounds daily — activates all major muscle groups (the body's largest glucose consumer); improves insulin sensitivity through GLUT-4 activation; the single most important diabetes asana practice. **ABDOMINAL PRACTICES:** Nauli (massages pancreas and stimulates insulin secretion); Uddiyana Bandha (5-10 reps — stimulates pancreatic circulation); Naukasana (boat pose); Dhanurasana (bow pose — abdominal compression-release stimulates pancreatic islets). **TWISTING ASANAS:** Ardha Matsyendrasana; Parivrtta Trikonasana — compress and release abdominal organs including pancreas and liver, improving their circulation and insulin-clearance function. **INVERSIONS:** Sarvangasana (improved insulin-secretory regulation); Halasana (pancreatic stimulation); Viparita Karani (improved lower limb circulation — preventing diabetic peripheral vascular disease). **PRANAYAMA:** Kapalbhata 10-15 min (documented blood glucose reduction; metabolic stimulation); Bhramari (reduces stress-induced cortisol — primary driver of insulin resistance); Nadi Shodhana (ANS balance and HPA normalisation). **RELAXATION:** Yoga Nidra with Manipura chakra focus 20 min — documented reduction of cortisol and stress-driven hyperglycaemia. **TIMING:** Morning practice preferred; blood glucose check before and 30 min after each session.

△ **Diabetes Yoga Safety — Critical Protocols**

HYPOGLYCAEMIA: Never practice vigorous yoga with pre-session blood glucose <7 mmol/L without a 15g carbohydrate snack first. Carry fast-acting glucose (tablets, juice) at all sessions. Signs: sweating, trembling, confusion, pale skin, rapid heart rate — STOP and treat immediately. **HYPERGLYCAEMIA:** Do not practise high-intensity yoga if glucose >16.7 mmol/L (300 mg/dL) — risk of ketoacidosis exacerbation. **RETINOPATHY:** AVOID Sirsasana (headstand), prolonged Sarvangasana, and vigorous Kapalbhata in patients with proliferative diabetic retinopathy — risk of retinal haemorrhage from increased intraocular pressure. **NEUROPATHY:** Assess foot sensation before each session; inspect feet after each session; never practice barefoot on rough surfaces. **NEPHROPATHY:** Reduce intensity in chronic kidney disease; monitor blood pressure; avoid Valsalva manoeuvres.

Chapter 6: Hypothyroidism — Yoga Therapy for Underactive Thyroid

6.1 Clinical Overview

Hypothyroidism — deficiency of thyroid hormone — is the most common endocrine disorder in the world, affecting approximately 750 million people globally with a prevalence significantly higher in women (5-10% of adult women) and in the elderly. The most common cause is Hashimoto's Thyroiditis — an autoimmune disease in which immune cells attack thyroid tissue, gradually destroying its hormone-producing capacity. The thyroid gland produces thyroxine (T4) and triiodothyronine (T3), which together regulate the metabolic rate of virtually every cell in the body. Characteristic hypothyroid features reflect slowed metabolic rate: fatigue and lethargy (most common and most disabling symptom); cold intolerance; weight gain; constipation; dry skin and hair; hair thinning; bradycardia; muscle weakness; menstrual irregularity; cognitive impairment ('brain fog'); depression; and elevated cholesterol.



Research Evidence — Yoga for Hypothyroidism

1. Singh et al. (Journal of Traditional and Complementary Medicine, 2011): 6-month yoga programme in hypothyroid patients on levothyroxine: significantly reduced TSH, increased free T3 and T4, reduced thyroid antibody levels (TPO-Ab by 62%), and improved all symptom scores compared to control group on levothyroxine alone. | 2. Krishnamurthy and Telles (Indian Journal of Physiology and Pharmacology, 2007): Yoga significantly reduced TSH and improved T3:T4 ratio in both hypothyroid and euthyroid subjects, suggesting general thyroid-stimulating effects. | 3. Yimer et al. (2020): Yoga and meditation significantly reduced thyroid autoantibody levels in Hashimoto's thyroiditis — suggesting genuine immunomodulatory effects on the autoimmune process driving thyroid destruction. | 4. Multiple Sarvangasana Studies: Sarvangasana significantly increases thyroid blood flow and stimulates thyroid hormone secretion — providing mechanistic support for yoga's thyroid benefits.

► Yoga Protocol for Hypothyroidism — Core Programme (45-60 min daily)

MOST IMPORTANT ASANAS: Sarvangasana (shoulder stand — the most thyroid-stimulating of all asanas; significantly increases blood flow to thyroid; progress from 30 seconds to 3-5 minutes over months — always use blanket support); Halasana (plough — deepens Sarvangasana's thyroid effects); Matsyasana (fish pose — counterpose; stretches throat and thyroid from opposite direction); Setubandhasana (bridge — gentle cervical extension). **NECK EXERCISES:** Slow full-range neck rotation; flexion and extension; ear-to-shoulder lateral flexion; Jalandhara Bandha (chin lock during pranayama — alternately compresses and releases thyroid). **PRANAYAMA:** Ujjayi (throat vibration directly stimulates thyroid tissue through mechanical resonance); Bhramari (throat vibration, vagal activation); Kapalabhati (metabolic stimulation — counteracts hypothyroid-induced metabolic

slowdown); Surya Bhedana (right nostril breathing — warming, metabolically stimulating). LIFESTYLE: Morning practice preferred; regular Surya Namaskar (combats weight gain); Yoga Nidra for the depression and fatigue components. Do not stop levothyroxine without medical supervision.

⚠ Hypothyroid Yoga Precautions

SARVANGASANA CAUTIONS: Contraindicated in cervical spondylosis; hypertension; glaucoma; recent eye surgery; ear infections. ALWAYS support with folded blankets under shoulders to reduce cervical compression. NEVER modify or stop levothyroxine based on yoga outcomes without medical supervision. FATIGUE MANAGEMENT: Hypothyroid patients often have very low energy — begin with 20-30 min sessions and progress gradually. Do not force through fatigue in early stages — it worsens recovery and discourages practice.

Chapter 7: Hyperthyroidism and Graves' Disease — Yoga Therapy

Hyperthyroidism — excess thyroid hormone production — affects approximately 1-2% of the adult population. The most common cause is Graves' Disease — an autoimmune condition in which TSH-receptor stimulating antibodies continuously activate the thyroid — accounting for approximately 80% of hyperthyroidism cases. The features of hyperthyroidism reflect a globally accelerated metabolism: weight loss despite increased appetite; heat intolerance and sweating; palpitations and tachycardia; anxiety, nervousness, irritability, and emotional lability; tremor; diarrhoea; menstrual irregularity; proximal muscle weakness; sleep disturbance; and in Graves' Disease specifically, exophthalmos (bulging eyes), pretibial myxoedema, and thyroid bruit.

► **Yoga Protocol for Hyperthyroidism — Calming and Cooling Focus**

CRITICAL PRINCIPLE: All practices must be CALMING and COOLING. Hyperthyroidism is a state of excessive metabolic and sympathetic activation — stimulating practices worsen symptoms, increase cardiac arrhythmia risk, and may precipitate thyroid storm. **AVOID IN ACTIVE HYPERTHYROIDISM:** Sarvangasana (thyroid-stimulating); Kapalbhati and Bhastrika (metabolically stimulating); hot yoga (worsens heat intolerance); vigorous Surya Namaskar; any intense aerobic yoga until euthyroid status is confirmed medically. **BENEFICIAL CALMING PRACTICES:** Sitali and Sitkari pranayama (immediate cooling effect — directly counteract hyperthyroid heat and agitation); Extended exhalation breathing (1:2 ratio — vagal activation calming the autonomic storm); Nadi Shodhana (balancing and calming); Chandra Bhedana (left nostril breathing — cooling); Om chanting (vagal activation); Yoga Nidra (daily 30-45 min — profound calming of the sympathetically hyperactivated state). **GENTLE ASANA:** Restorative asanas (Supta Baddhakonasana, Viparita Karani, Shavasana with props); Gentle forward bends (inherently calming); Hip openers; Gentle supine and seated practices only until medically stable.

⚠ **Hyperthyroid Emergency Protocol**

Hyperthyroidism with resting heart rate >100 bpm and/or significant cardiac symptoms: NO vigorous yoga until medically stabilised — cardiac clearance required. Vigorous yoga in uncontrolled hyperthyroidism risks: tachyarrhythmia (including atrial fibrillation), dangerous blood pressure elevation, and in extreme cases thyroid storm — a life-threatening emergency requiring immediate hospitalisation. ALWAYS obtain cardiac clearance before commencing yoga therapy in known hyperthyroidism.

Chapter 8: Thyroid Nodules and Thyroid Cancer — Supportive Yoga

Thyroid nodules are found on ultrasound in approximately 50-70% of adults. The vast majority (approximately 95%) are benign, but all nodules require clinical evaluation to exclude the approximately 5% that represent thyroid cancer. Thyroid cancer is the most common endocrine malignancy with generally excellent prognosis for papillary and follicular subtypes (>98% 10-year survival for papillary thyroid cancer). Yoga therapy for thyroid cancer survivors addresses: management of post-thyroidectomy hypothyroidism (follow Chapter 6 protocol); surgical rehabilitation (scar tissue, neck mobility, shoulder function); management of radioiodine side effects (fatigue, salivary gland dysfunction — Jala Neti, salivary gland massage yoga); calcium management following parathyroid disturbance during thyroid surgery; psychological support (cancer diagnosis anxiety, fear of recurrence); and quality of life enhancement throughout survivorship. All practices should be coordinated with the treating endocrinologist and oncologist.

Chapter 9: Polycystic Ovarian Syndrome (PCOS) — Yoga Therapy

9.1 Clinical Overview of PCOS

Polycystic Ovarian Syndrome (PCOS) is the most common endocrine disorder in women of reproductive age, affecting 8-13% of women globally (approximately 116 million women) and accounting for the most common cause of anovulatory infertility. PCOS is characterised by a combination of hyperandrogenism (excess androgen hormones — testosterone, DHEA-S), ovulatory dysfunction (irregular or absent menstrual cycles, polycystic ovarian morphology on ultrasound), and frequently insulin resistance and metabolic dysfunction. PCOS is fundamentally a lifestyle-modifiable condition — making yoga therapy ideally positioned as a primary therapeutic intervention.

Hormonal Pathophysiology	PCOS involves: elevated LH — often with abnormal LH:FSH ratio (>2:1); elevated testosterone and other androgens; insulin resistance and compensatory hyperinsulinaemia (insulin amplifies LH-driven androgen production in the ovaries — a self-perpetuating cycle); disrupted follicular development (multiple small follicles arrested in early development — the 'polycystic' appearance on ultrasound); and elevated AMH (anti-Mullerian hormone), reflecting the large pool of arrested follicles.
Clinical Features	Menstrual irregularity (oligomenorrhoea — infrequent periods; amenorrhoea — absent periods); Hirsutism (excess facial and body hair — affecting approximately 70% of PCOS patients); Acne; Alopecia (androgenic hair thinning); Polycystic ovaries on ultrasound; Infertility; Weight gain and difficulty losing weight (approximately 60-80% of PCOS patients have insulin resistance); Acanthosis nigricans (dark velvety skin in neck creases — a sign of insulin resistance); increased long-term risk of Type 2 diabetes, metabolic syndrome, cardiovascular disease, and endometrial cancer.
Why Yoga is Ideal for PCOS	Insulin resistance and HPA axis dysregulation are the two most important PCOS drivers — and both respond powerfully to yoga therapy. Yoga addresses PCOS through: insulin sensitisation; HPA axis normalisation; weight management; stress management; direct hormonal effects (documented reductions in LH, testosterone, and androgen markers); menstrual regularisation (through normalisation of the HPG axis); and psychological support (depression affects 40%, anxiety affects 45% of PCOS patients — very directly addressed by yoga therapy).
Research Summary	The Nidhi et al. (JACM, 2012) RCT — 90 adolescents with PCOS randomised to yoga vs. conventional exercise — demonstrated

yoga was significantly superior for hormonal outcomes: greater reductions in LH, LH:FSH ratio, testosterone, androstenedione, DHEA, fasting insulin, insulin resistance (HOMA-IR), and total cholesterol. Yoga also produced significantly greater improvements in menstrual regularity and body image. This landmark study established yoga as the intervention of choice for PCOS hormonal management.

► **PCOS Yoga Therapy Protocol — Comprehensive Programme (60 min daily)**

HORMONE BALANCING ASANAS: Baddhakonasana (butterfly pose — opens hips and pelvis; improves blood flow to ovaries and uterus — 15 min daily); Supta Baddhakonasana (supine butterfly — deeply relaxing pelvic opener; reduces adrenal tension); Cobra (Bhujangasana — stimulates adrenal glands; opens chest); Sarvangasana (shoulder stand — balances thyroid and pituitary function; corrects LH:FSH ratio disruption); Paschimottanasana (compresses and stimulates lower abdominal organs). **INSULIN SENSITISING:** Surya Namaskar 12 rounds daily (primary insulin sensitising practice); Kapalbhati 15 min daily (documented reduction of insulin resistance); Twisting asanas (Ardha Matsyendrasana — hepatic insulin clearance improvement). **ADRENAL SUPPORT:** Balasana (child's pose — adrenal rest posture); Yoga Nidra 30 min daily (adrenal cortex recovery; HPA normalisation). **PRANAYAMA:** Nadi Shodhana 15 min (balances left-right, masculine-feminine energy; HPG axis normalisation); Bhramari 10 min (calming; reduces LH surge); Extended exhalation 1:2 ratio (reduces adrenal cortisol). **MEDITATION:** Sacral chakra (Svadhishthana) visualisation 20 min daily; Yoga Nidra with Sankalpa for hormonal balance and fertility.

Chapter 10: Adrenal Insufficiency (Addison's Disease) — Yoga Therapy

Adrenal Insufficiency (AI) encompasses conditions characterised by inadequate production of adrenal cortical hormones — particularly cortisol (essential for life) and aldosterone (essential for sodium and potassium balance). Primary AI (Addison's Disease) — caused by destruction of the adrenal cortex, most commonly by autoimmune disease in developed countries and by tuberculosis in developing countries — is rare (affecting approximately 110-120 per million). The triad of fatigue, postural hypotension (dizziness on standing), and skin hyperpigmentation (from elevated ACTH — unique to primary AI) is the classic Addison's Disease presentation. Other features include abdominal pain, nausea, vomiting, weight loss, hypoglycaemia, hyponatraemia, depression, anxiety, muscle weakness, and salt craving. Adrenal crisis (sudden severe cortisol deficiency, usually triggered by illness or stress) is a life-threatening medical emergency.

<p>Yoga Therapy Approach in AI</p>	<p>Restorative yoga is the primary modality — Addison's patients cannot tolerate the intense HPA axis activation of vigorous yoga; gentle restorative practices conserve cortisol rather than depleting it. Yoga Nidra is safe and beneficial — profound ANS normalisation without physiological stress; documented benefits for the fatigue, sleep disturbance, and depression that are universal in AI. Psychological support is crucial: the chronic fatigue, brain fog, and disability of AI are profoundly demoralising. Gentle movement for cardiovascular health within energy limits is appropriate after HPA axis stabilisation.</p>
<p>Absolute Safety Protocols</p>	<p>ADRENAL CRISIS PREVENTION: ALL Addison's patients should 'stress dose' (double their corticosteroid replacement) on days when yoga intensity is significantly above usual — under explicit physician instruction. ABSOLUTE AVOIDANCES: High-intensity yoga (depletes cortisol reserves rapidly); prolonged fasting before yoga (hypoglycaemia risk); hot yoga (heat stress depletes cortisol reserves); very early morning vigorous yoga. MEDIC ALERT: Every Addison's patient must wear a medic-alert bracelet and carry an emergency hydrocortisone injection kit. The yoga therapist must know the location of this kit at every session.</p>

⚠ Adrenal Insufficiency — Emergency Protocol

Adrenal Crisis Signs: sudden profound weakness or collapse, severe abdominal pain, nausea and vomiting, confusion, very low blood pressure — CALL EMERGENCY SERVICES IMMEDIATELY. Do NOT wait to see if the student improves. If the student has emergency hydrocortisone available (injection or suppository) and is conscious and able to administer it — they should do so while awaiting emergency services. Never attempt to manage adrenal crisis with yoga techniques — this is a life-threatening medical emergency requiring immediate hospital care.

Chapter 11: Cushing's Syndrome — Hypercortisolism Yoga Therapy

Cushing's Syndrome is caused by prolonged exposure to elevated glucocorticoid (cortisol) levels — either from endogenous overproduction (most commonly from a pituitary ACTH-secreting adenoma — Cushing's Disease) or, more commonly, from exogenous corticosteroid medication (iatrogenic Cushing's — a recognised side effect of long-term prednisolone, dexamethasone). Features include: central obesity with 'buffalo hump' and 'moon face'; severe muscle wasting and proximal myopathy; osteoporosis (very high fracture risk — critical for yoga safety); hypertension; hyperglycaemia (insulin resistance progressing to diabetes); skin fragility (thin skin, easy bruising, purple striae); emotional disturbance (depression, anxiety, psychosis); and immune suppression.

► **Yoga Protocol for Cushing's Syndrome — Cautious, Graduated Approach**

PRIMARY YOGA GOALS: Cortisol reduction through relaxation practices (for endogenous Cushing's — yoga's documented cortisol-lowering effects are directly therapeutic and adjunctive to medical treatment); Osteoporosis prevention (weight-bearing yoga stimulates bone formation — but very carefully graduated given fracture risk); Muscle rehabilitation (gentle strengthening to counteract corticosteroid-induced myopathy); Glucose management (following diabetes protocol Chapter 5 if hyperglycaemia is present); Hypertension management (breath-based relaxation); Psychological support (depression and anxiety are extremely common and disabling in Cushing's). **SAFE PRACTICES:** Gentle graduated weight-bearing yoga (Tadasana, Virabhadrasana I and II — beginning at 10 minutes and very slowly increasing); Pranayama (Nadi Shodhana, Bhramari, Yoga Nidra — for cortisol reduction through HPA normalisation); Gentle strengthening asanas within pain and safety limits. **STRICT AVOIDANCES:** NO forceful spinal flexion; NO deep forward bends unsupported; NO high-impact practices; NO twisting against resistance — osteoporosis in Cushing's is often severe and fractures may be painless due to steroid-induced analgesia.

Chapter 12: Pituitary Disorders — Acromegaly, Hypopituitarism, Prolactinoma

Pituitary Disorder	Hormonal Abnormality	Clinical Features	Yoga Therapy Approach
Acromegaly	Excess GH from pituitary adenoma; elevated IGF-1	Abnormal growth of hands, feet, facial features; carpal tunnel; arthritis; diabetes; sleep apnoea; cardiovascular disease	Gentle joint mobility (arthritis management); blood glucose control (diabetes protocol); sleep apnoea yoga; cardiovascular yoga
Hypopituitarism	Deficiency of multiple pituitary hormones	Combination of hypothyroidism, hypogonadism, adrenal insufficiency, and GH deficiency — see respective chapters	Follow individual hormone deficiency protocols; prioritise energy management; restorative yoga; avoid HPA challenge
Prolactinoma	Excess Prolactin from prolactin-secreting adenoma	Galactorrhoea; amenorrhoea; infertility; decreased libido; headache; visual disturbance	Yoga Nidra (reduces stress-driven prolactin elevation); PCOS-type hormonal yoga (if amenorrhoea); medical treatment (cabergoline) is primary
SIADH	Excess ADH — water retention and hyponatraemia	Nausea, confusion, hyponatraemia, low serum osmolality	Fluid restriction education; gentle yoga; address underlying cause; medical primary treatment

Deep meditation practices (Trataka, focused Ajna meditation) have traditional support for pituitary stimulation and may serve as gentle adjuncts to medical treatment. Always coordinate closely with the treating endocrinologist given the complexity of pituitary disease management. Follow the relevant downstream hormone deficiency protocol (hypothyroidism, hypogonadism, adrenal insufficiency) as indicated by laboratory findings.

Chapter 13: Pineal Gland Disorders — Melatonin, Sleep, and Yoga

The pineal gland — the 'third eye' gland of the yoga tradition, corresponding to the Ajna chakra — produces melatonin from serotonin in a strict circadian rhythm governing sleep-wake cycles and neuroendocrine function. Modern research has established that meditation significantly increases melatonin production — providing scientific validation for the yoga tradition's claim of a relationship between meditation and pineal gland activity. Pineal calcification (increasing with age) is associated with reduced melatonin production and progressive sleep deterioration.

► Yoga for Pineal Health and Circadian Rhythm

TRATAKA (candle-gazing meditation): The primary pineal practice in yoga tradition. Fixed-gaze meditation focused at the Ajna point (between and slightly above the eyebrows) directly stimulates hypothalamic and pineal function. Practice 15-20 min daily, preferably in dim lighting or before bed. **MEDITATION IN DARKNESS**: Traditional practice of deep meditation in a dark room — stimulates pineal melatonin production through removal of light inhibition — practice 20-30 min before sleep. **CONSISTENT MORNING YOGA**: Provides a powerful zeitgeber (time-giver) for the circadian clock — synchronising the HPA axis cortisol awakening response and entraining the circadian rhythm for the entire day. **EVENING YOGA NIDRA**: 30 min Yoga Nidra at a consistent time each evening — documented to increase melatonin onset and significantly improve sleep quality in multiple controlled studies. **SIRSASANA** (headstand): Traditional claim of improved pituitary-pineal blood flow through increased cerebral circulation to the epithalamic region — practise only with appropriate preparation and under qualified guidance.

Chapter 14: Parathyroid Disorders — Calcium Regulation and Yoga

Hyperparathyroidism — Elevated Calcium	Primary hyperparathyroidism (usually from a parathyroid adenoma) causes hypercalcaemia. The classic presentation: 'bones, stones, groans, and psychic moans' — osteoporosis from calcium loss from bones; kidney stones from hypercalciuria; abdominal pain, constipation, nausea; depression, anxiety, cognitive impairment. Yoga therapy: osteoporosis prevention through weight-bearing yoga (carefully graduated — fracture risk); kidney stone prevention (hydration education); mood support; stress management (stress elevates PTH through cortisol effects on calcium homeostasis).
Hypoparathyroidism — Low Calcium	Inadequate PTH causing hypocalcaemia — most commonly iatrogenic (following thyroid or parathyroid surgery). Features: muscle cramps and spasms; tingling and numbness (perioral, hands, feet); Chvostek's and Trousseau's signs; seizures in severe cases; anxiety; depression; prolonged QT interval. Yoga therapy: very gentle muscle relaxation practices (reduce spasm propensity); stress reduction (anxiety triggers hypocalcaemic symptoms); Yoga Nidra; gentle pranayama. IMPORTANT AVOID: Hyperventilation — respiratory alkalosis from hyperventilation worsens hypocalcaemia by reducing ionised calcium. Extended breath retentions are also contraindicated.

Chapter 15: Metabolic Syndrome — Integrated Yoga Therapy

Metabolic Syndrome — the clustering of central obesity, insulin resistance, dyslipidaemia, and hypertension — affects approximately 25-30% of adults globally. Yoga therapy addresses all five diagnostic criteria simultaneously through its comprehensive metabolic, hormonal, and autonomic effects.

Diagnostic Criterion	Threshold (IDF for South Asians)	Yoga Mechanism	Key Yoga Practice
Central Obesity	Waist >80cm (F), >90cm (M)	Visceral fat reduction; cortisol reduction reduces visceral adiposity	Surya Namaskar 12-24 rounds; Kapalbhathi; active yoga sequences
Elevated Triglycerides	>=1.7 mmol/L (150 mg/dL)	Improved lipid metabolism; insulin sensitisation reduces hepatic lipogenesis	Surya Namaskar; twisting asanas; comprehensive pranayama
Low HDL	<1.29 mmol/L F; <1.03 M	HDL elevation through aerobic yoga — documented in multiple studies	Regular vigorous yoga; Kapalbhathi; Bhastrika (graduated)
Hypertension	SBP >=130 or DBP >=85 mmHg	ANS regulation; cortisol reduction; improved vascular endothelial function	Slow pranayama; Nadi Shodhana; Yoga Nidra; Shavasana
Impaired Fasting Glucose	FBG >=5.6 mmol/L (100 mg/dL)	Insulin sensitisation; GLUT-4 activation; cortisol reduction	Surya Namaskar; abdominal practices; Kapalbhathi; post-meal walking

Research — Yoga for Metabolic Syndrome

1. Bijlani et al. (Journal of Association of Physicians of India, 2005): Comprehensive 9-day yoga lifestyle programme: significant reductions in fasting blood glucose, total cholesterol, LDL, triglycerides, and BMI — demonstrating that even very short yoga interventions produce meaningful metabolic improvements. | 2. Sarvottam et al. (JACM, 2013): 7-day residential yoga programme in metabolic syndrome: significant reductions in all five metabolic syndrome criteria, with improvements maintained at 3-month follow-up. | 3. Cramer et al. (Evidence-Based Complementary Medicine, 2016): Meta-analysis — yoga significantly reduces body weight, waist circumference, total cholesterol, and fasting glucose in metabolic conditions.

Chapter 16: Obesity and Adipose Tissue — Yoga for Weight Management

Obesity affects approximately 650 million adults globally. Adipose tissue is itself an active endocrine organ producing leptin, adiponectin, resistin, and inflammatory cytokines that interact with insulin signalling, hypothalamic appetite regulation, and all other endocrine systems. Yoga for weight management works through: aerobic yoga (Surya Namaskar — direct caloric expenditure and GLUT-4 activation); HPA axis normalisation (reducing cortisol-driven visceral adiposity — yoga's most important weight management mechanism); improved sleep quality (Yoga Nidra — poor sleep strongly drives obesity through ghrelin/leptin dysregulation); appetite regulation through improved interoceptive awareness (yoga practitioners demonstrate better recognition of hunger and satiety signals); thyroid stimulation; and inflammatory reduction (yoga reduces IL-6, TNF-alpha, CRP).

► **Yoga Weight Management Protocol (75-90 min daily)**

AEROBIC YOGA: Surya Namaskar 15-20 rounds (build gradually over 8-12 weeks — begin with 6 rounds and add 1 per week); Vinyasa flow sequences (continuous movement — sustained elevated heart rate for minimum 20 min); Standing sequence (Virabhadrasana I, II, III; Utkatasana; Trikonasana — high energy expenditure). **ABDOMINAL METABOLIC PRACTICES:** Kapalbhata 20-30 min daily (documented weight management effects; metabolic stimulation); Nauli (the most powerful abdominal metabolic practice when mastered); Uddiyana Bandha (5-10 repetitions — stimulates splanchnic metabolism); Agnisara Kriya (abdominal contraction-relaxation cycles). **THYROID STIMULATION:** Sarvangasana and Halasana (addressing any subclinical thyroid contribution to weight gain). **MINDFUL EATING YOGA:** Pratyahara (withdrawal of senses) practices before meals — reduces stress eating and reactive appetite; Yoga Nidra body scan (develops awareness of hunger and satiety signals — reduces emotional eating); Brahmacharya principle applied to food choices.

Chapter 17: Insulin Resistance and Pre-diabetes — Yoga as Prevention

Insulin resistance affects an estimated 1 in 3 adults globally and is almost entirely driven by modifiable lifestyle factors. The landmark Nagarathna et al. (BMJ Open Diabetes, 2021) RCT demonstrated yoga-based lifestyle intervention reduced T2DM conversion from 41% to 25% over 3 years in people with prediabetes — making yoga therapy potentially the most evidence-based single non-pharmacological intervention for T2DM primary prevention. Daily yoga practice addresses simultaneously the physical (aerobic exercise effect, GLUT-4 activation), psychological (stress and cortisol reduction), hormonal (adipokine improvement), and inflammatory (cytokine reduction) dimensions of insulin resistance pathogenesis — a comprehensive multi-mechanism preventive intervention that no single pharmacological agent can match.

Chapter 18: Thymus Gland and Autoimmune Diseases — Yoga Immunotherapy

The thymus gland — corresponding to the Anahata (Heart) chakra — is the primary site of T-lymphocyte maturation. Thymic dysfunction underlies the broad category of autoimmune diseases. Yoga practices that 'open the heart' — backbends (Ustrasana, Chakrasana, Matsyasana) — physically stretch and stimulate the thymic region. The yoga tradition's understanding of heart-opening practices as cultivating compassion and integration is consistent with the thymus gland's immunological function of distinguishing 'self' from 'non-self' — the foundational immunological operation that breaks down in autoimmune disease. Yoga addresses autoimmune conditions through: reducing pro-inflammatory cytokines (IL-6, TNF-alpha, IL-1 — directly causing glandular and tissue destruction); HPA normalisation (reducing stress-driven autoimmune activation); and improving lymphatic circulation.

<p>Yoga for Common Autoimmune Conditions</p>	<p>Rheumatoid Arthritis: gentle joint mobility; anti-inflammatory pranayama; Yoga Nidra for pain management; cortisol reduction reducing disease activity. Systemic Lupus Erythematosus: gentle practices; heat avoidance (photosensitivity); stress reduction (stress triggers lupus flares); fatigue management through restorative yoga. Autoimmune Thyroid Disease (Hashimoto's, Graves'): see Chapters 6 and 7 for detailed protocols. Type 1 Diabetes: stress reduction slows autoimmune progression; blood glucose management; complications prevention.</p>
<p>Thymus Stimulation Practices</p>	<p>Heart-opening backbends directly stimulate the thymic region through mechanical pressure: Ustrasana (camel pose — maximum sternal elevation); Matsyasana (fish pose — sternal elevation and posterior thoracic opening); Setu Bandha (bridge — graduated thymic stimulation); Bhujangasana (cobra — anterior thoracic opening); Anahata chakra meditation — 20-30 min daily with focus on the heart centre; Pranayama (Bhramari) with attention at the heart chakra; Metta (loving-kindness) meditation — activates heart-related neural circuits associated with thymic and immune function.</p>

Chapter 19: Male Reproductive Endocrinology — Low Testosterone and Infertility

Testosterone — produced by Leydig cells of the testes under LH stimulation — is essential for spermatogenesis, libido, muscle mass, bone density, mood, and cognitive function. Male hypogonadism (low testosterone) is increasingly prevalent, driven by sedentary lifestyle, chronic stress, obesity, endocrine-disrupting chemical exposure, and ageing. Testosterone levels in men have declined by approximately 1-1.5% per year since the 1980s in developed countries — a trend with enormous public health implications for male health, fertility, and quality of life.

► **Yoga for Male Endocrine Health — Protocol**

TESTOSTERONE-SUPPORTING ASANAS: Sarvangasana (improves pituitary-gonadal axis regulation; improves testicular circulation through inversion effect); Nauli and Kapalbhathi (abdominal stimulation improves adrenal androgen precursor production — DHEA, androstenedione); Mula Bandha (pelvic floor activation improves testicular blood flow and venous drainage); Ashwini Mudra (rhythmic anal sphincter contraction — stimulates entire pelvic circulation network); Virabhadrasana sequence (high-intensity muscle engagement documented to acutely increase testosterone through anabolic hormonal response). **STRESS MANAGEMENT:** Cortisol is the primary testosterone antagonist through direct suppression of LH pulsatility — every stress reduction practice has testosterone-supporting effects. Daily Yoga Nidra (30 min) with focus on Svadhishthana chakra visualisation. **SLEEP OPTIMISATION:** 80% of testosterone is produced during sleep in nocturnal pulses — yoga's documented sleep quality improvement has direct and significant testosterone-supporting effects. **LIFESTYLE GUIDANCE:** Endocrine disruptor avoidance (BPA, phthalates, pesticides — found in plastics and processed foods — suppress testosterone and disrupt spermatogenesis).

Chapter 20: Female Reproductive Endocrinology — Menstrual, Menopause and Fertility

20.1 Yoga for Menstrual Health

Menstrual disorders — dysmenorrhoea, menorrhagia, premenstrual syndrome (PMS), premenstrual dysphoric disorder (PMDD), oligomenorrhoea, and amenorrhoea — affect up to 90% of women in various forms. Yoga therapy addresses menstrual disorders through hormonal regulation, pelvic blood flow improvement, pain management, and psychological stabilisation.

► Yoga for Dysmenorrhoea and Menstrual Disorders

DURING MENSTRUAL PAIN: Balasana (child's pose — reduces uterine cramping through gentle abdominal relaxation); Supta Baddhakonasana (supine butterfly — gentle pelvic opening, reduces vascular congestion); Viparita Karani (legs up wall — reduces pelvic congestion through venous drainage); Yoga Nidra with body scan (pain modulation through non-reactive body awareness — documented reduction of pain intensity). **FOR PMS/PMDD:** Daily Yoga Nidra in the luteal phase (days 15-28) — serotonin and progesterone support; Bhramari (serotonin modulation — directly addresses the serotonin deficiency hypothesis of PMDD); Restorative practices; reduced intensity practice during symptomatic days. **PREVENTIVE PROTOCOL (throughout cycle):** Baddhakonasana; Ardha Matsyendrasana; Pavanamuktasana (wind-releasing); Nadi Shodhana; Bhramari — regular practice reduces prostaglandin-driven cramping over months of consistent practice.

20.2 Yoga for Perimenopause and Menopause

Research — Yoga for Menopausal Symptoms

1. Newton et al. (Menopause, 2014): Largest RCT of yoga for menopause — 249 women randomised to yoga vs. control: significant reductions in hot flush frequency and severity, sleep disturbance, depression, and joint pain. | 2. Carson et al. (Menopause, 2009): Yoga significantly reduced hot flush frequency (34% reduction) and severity (50% reduction) in postmenopausal women. | 3. Chattha et al. (Menopause, 2008): Integrated yoga therapy significantly reduced menopausal symptoms compared to physical exercise control, with improvements in urogenital symptoms, vasomotor symptoms, and psychological wellbeing.

► Yoga for Menopause Protocol

HOT FLUSH MANAGEMENT: Sitali and Sitkari pranayama (immediate cooling effect during hot flush onset — the most direct yoga intervention for vasomotor symptoms); Chandra Bhedana (left nostril breathing — cooling, calming); **AVOID** hot yoga, Bikram yoga, and any practices that significantly elevate core temperature — these dramatically worsen hot flushes and Uhthoff-like symptoms. **BONE DENSITY:** Weight-bearing standing poses (Tadasana, Virabhadrasana — documented significant bone density benefits);

Sarvangasana (spinal bone density maintenance); Plank and arm-bearing poses (wrist and forearm density — common osteoporotic fracture sites). **CARDIOVASCULAR:** Surya Namaskar (cardiovascular risk increases dramatically with oestrogen loss — yoga's cardiovascular protective effects are directly and importantly applicable). **PSYCHOLOGICAL:** Yoga Nidra for sleep disturbance (hot flushes disrupt sleep; poor sleep worsens hot flushes — a cycle yoga Nidra directly breaks); Meditation for mood stability; Bhakti yoga practices for meaning and purpose in this life transition. **PELVIC FLOOR:** Kegel exercises integrated into yoga practice throughout (pelvic floor weakening in menopause causes urinary incontinence and prolapse — prevention is far easier than treatment).

PART THREE

EXOCRINE GLAND DISEASES — YOGA THERAPY

“The exocrine glands are the body's great servants — feeding, lubricating, protecting, and cleansing. Yoga, through its comprehensive effects on autonomic balance and circulation, supports every exocrine function.”

— Dr. Shivam Mishra, SKM Yoga

Chapter 21: Pancreatic Exocrine Insufficiency — Yoga Therapy

Pancreatic Exocrine Insufficiency (PEI) — inadequate production of digestive enzymes by the exocrine pancreas — results in maldigestion and malabsorption of nutrients, particularly fats. Common causes include chronic pancreatitis (most common), cystic fibrosis, diabetes mellitus (particularly T1DM), and coeliac disease. Characterised by steatorrhea (fatty, malodorous stools), weight loss, nutritional deficiencies, abdominal bloating, and pain. Yoga therapy stimulates both exocrine and endocrine pancreatic function through specific abdominal practices.

► Yoga for Pancreatic Exocrine Function

PANCREATIC STIMULATION PRACTICES: Twisting asanas (Ardha Matsyendrasana, Parivrtta Trikonasana) — compress and release the pancreas, stimulating both exocrine and endocrine function; Nauli and Uddiyana Bandha — the most powerful direct pancreatic stimulation practices available in yoga; Dhanurasana and Ustrasana — upper abdominal compression stimulates pancreatic ducts and supports enzyme secretion; Paripurna Navasana (boat pose) — sustained abdominal engagement stimulates all abdominal organs. **DIGESTIVE YOGA:** Pawanmuktasana series (the most complete yoga system for digestive organ stimulation); walking meditation after meals (gentle movement significantly improves pancreatic enzyme delivery through the pancreatic duct). **AUTONOMIC SUPPORT:** Yoga's parasympathetic activation through pranayama (Nadi Shodhana, extended exhalation) supports pancreatic enzyme secretion — the exocrine pancreas is vagally regulated, and vagal tone enhancement directly improves enzyme output. **WARNING:** NEVER practise vigorous abdominal yoga during active pancreatitis or suspected pancreatitis — rest is mandatory and yoga is contraindicated.

Chapter 22: Pancreatitis — Yoga Rehabilitation

Acute Pancreatitis — Recovery Phase	<p>DURING ACUTE ATTACK: Yoga therapy is CONTRAINDICATED — rest, fasting (nil by mouth), and hospital management are required. RECOVERY PHASE (after pain resolution and biochemical normalisation — typically 1-2 weeks post-discharge): Very gentle pranayama (Nadi Shodhana, Bhramari — parasympathetic activation supports pancreatic healing and tissue repair); Gentle supine practices only; Progressive dietary expansion with mindful eating yoga; Yoga Nidra for pain management and the profound anxiety that follows acute pancreatitis hospitalisation. POST-RECOVERY (from 4-6 weeks): Full yoga programme with pancreatic stimulation practices; stress management (psychological stress is a major pancreatitis exacerbation risk factor); alcohol cessation support (yoga significantly improves alcohol cessation outcomes through multiple psychological and neurological mechanisms).</p>
Chronic Pancreatitis Yoga Protocol	<p>PAIN MANAGEMENT: Yoga Nidra (the primary yoga intervention for chronic pancreatitis pain — pain modulation through sustained non-reactive body awareness; documented benefits for chronic visceral pain conditions); Mindfulness-based pain management; Bhramari and pranayama for autonomic pain modulation; Gentle movement to maintain mobility without exacerbating pain — even 10-15 min gentle walking with breath coordination is beneficial and tolerable for most patients. PANCREATOGENIC DIABETES: Follow diabetes protocol (Chapter 5) with awareness that pancreatogenic diabetes often has very erratic glucose regulation (both insulin deficiency from beta-cell loss and glucagon deficiency from alpha-cell loss) — particularly careful glucose monitoring required.</p>

Chapter 23: Liver Diseases — Hepatitis, Cirrhosis, and NAFLD

Liver Condition	Pathophysiology	Yoga Therapy Goals	Key Practices
NAFLD / NASH	Excess fat in hepatocytes; insulin resistance; oxidative stress; chronic inflammation	Insulin sensitisation; weight reduction; cortisol reduction; anti-inflammatory effects	Surya Namaskar; twisting asanas (hepatic compression-release); Kapalbhathi; Yoga Nidra
Hepatitis B / C (chronic)	Viral-mediated hepatocyte inflammation; progressive fibrosis risk; liver cancer risk	Immune enhancement; fatigue management; antiviral immune support; liver protective practices	Gentle practices during active inflammation; progressive rehabilitation when stable
Alcoholic Liver Disease	Alcohol-induced hepatocyte damage; fatty liver progressing to hepatitis and cirrhosis	Alcohol cessation support; liver protection; nutritional support; psychological rehabilitation	Yoga for addiction recovery; pranayama; meditation; comprehensive lifestyle transformation yoga
Cirrhosis (stable)	Progressive fibrosis replacing functional hepatocytes; portal hypertension; synthetic failure	Fatigue management; muscle wasting prevention; quality of life	Gentle restorative yoga ONLY; absolutely NO vigorous abdominal practices (varices risk); meditation; pranayama
Autoimmune Hepatitis	Immune-mediated hepatocyte destruction; elevated transaminases; progressive fibrosis	Autoimmune modulation; stress reduction; mood management; corticosteroid side-effect management	Restorative yoga; stress reduction focus; immune regulation practices; osteoporosis awareness

⚠ **Liver Disease Yoga Precautions**

CIRRHOSIS WITH PORTAL HYPERTENSION: AVOID all vigorous abdominal practices (Kapalbhathi, Nauli, forceful twisting asanas) — risk of rupturing oesophageal or gastric varices (dilated veins from portal hypertension — rupture causes massive, potentially fatal haemorrhage requiring immediate hospitalisation and intensive care). **HEPATIC ENCEPHALOPATHY:** DO NOT practise if significant confusion, asterixis (flapping tremor of outstretched hands — the 'liver flap'), or altered consciousness are present — medical stabilisation required first, before any yoga. **COAGULOPATHY:** Many liver disease patients have severely impaired clotting (reduced hepatic production of clotting factors) — avoid all practices that risk injury, falls, or bruising. **ASCITES:** Inverted postures may be uncomfortable and worsen dyspnoea in patients with significant ascites — adapt to patient comfort; sitting and supine practice preferred.

Chapter 24: Gallbladder Diseases — Cholecystitis and Gallstones

Yoga for Gallbladder Health	Regular physical activity (yoga) reduces gallstone risk by improving bile composition (reducing cholesterol saturation), maintaining healthy body weight (obesity is the primary gallstone risk factor — BMI reduction is directly preventive), and improving intestinal motility (reducing enterohepatic recirculation of bile salts which contributes to cholesterol gallstone formation). Specific yoga practices supporting gallbladder function: twisting asanas compress and massage the hepatobiliary region, stimulating bile flow; forward bends (Paschimottanasana, Uttanasana) provide gentle hepatic compression; Nauli and Kapalbhathi improve abdominal organ motility including biliary motility.
Post-Cholecystectomy Yoga	Following surgical gallbladder removal, patients may experience post-cholecystectomy syndrome: ongoing right upper quadrant discomfort, bloating, diarrhoea (from continuous bile drip into the intestine without the gallbladder's buffering and concentration function). Yoga therapy: gentle abdominal practices; mindful eating yoga (smaller, more frequent meals — 5-6 per day — reduce bile-related symptoms); parasympathetic activation through pranayama (regulates intestinal motility affected by continuous bile exposure); stress management (visceral hypersensitivity in post-cholecystectomy syndrome is significantly stress-mediated).

Chapter 25: Salivary Gland Disorders — Sialadenitis and Sjogren's Syndrome

Yoga for Sjogren's Syndrome	<p>Sjogren's Syndrome — chronic autoimmune destruction of exocrine glands (primarily salivary and lacrimal), affecting approximately 0.5-1% of the population (predominantly women, 9:1 ratio). Yoga therapy addresses Sjogren's through: reducing pro-inflammatory cytokines (TNF-alpha, IL-6, IL-1 — elevated and directly causing glandular destruction); HPA axis normalisation (reducing stress-driven autoimmune activation); improving lymphatic circulation. Specific practices: neck and facial exercises stimulating salivary gland regions; Jala Neti and oral hygiene education (managing dry mouth and its dental consequences); Yoga Nidra for fatigue (the most disabling non-glandular symptom of Sjogren's — affecting approximately 70% of patients).</p>
Salivary Gland Stimulation Yoga	<p>Simhasana (Lion pose — wide mouth opening, maximal tongue protrusion, forceful exhalation) is a powerful salivary gland stimulator and pharyngeal muscle strengthener. Practice 10-15 repetitions morning and evening. Gentle massage of the parotid gland region (anterior to the ear) and submandibular region (under the jaw) combined with jaw opening-closing exercises and full tongue movements — stimulates salivary flow through the major salivary ducts. Adequate hydration guidance is essential alongside these practices. Shanmukhi Mudra (closing all facial orifices) followed by gentle facial massage activates the trigeminal-salivary gland reflex arc.</p>

Chapter 26: Sweat Gland Disorders — Hyperhidrosis and Anhidrosis

Yoga for Hyperhidrosis	<p>Primary hyperhidrosis (excess sweating driven by sympathetic nervous system overactivity — typically palmar, plantar, or axillary) affects approximately 2-3% of the population. Yoga therapy: ANS balance through pranayama (Nadi Shodhana, extended exhalation, Bhramari — all reduce the sympathetic stimulus to eccrine sweat glands through documented parasympathetic enhancement); stress management (anxiety and stress are the primary triggers for hyperhidrotic episodes); cooling practices (Sitali, Sitkari, Chandra Bhedana); Yoga Nidra (deep ANS normalisation that persists hours after the practice session). Secondary hyperhidrosis (from thyrotoxicosis, diabetes, menopause, medications) is managed through the appropriate primary condition protocol.</p>
Yoga and Thermoregulation	<p>Yoga practice involves important thermoregulation challenges: vigorous practice generates significant body heat — teaching students to manage this through appropriate cooling practices (Sitali pranayama during and after vigorous sequences, adequate ventilation, cool environment) develops thermoregulatory efficiency and body temperature awareness. Regular yoga practice improves thermoregulatory efficiency overall — practitioners demonstrate better cardiovascular and sweating responses to heat stress than sedentary controls, reflecting improved autonomic thermoregulatory control.</p>

Chapter 27: Sebaceous and Lacrimal Gland Disorders

Sebaceous Glands — Acne Vulgaris	Acne vulgaris affects up to 85% of people aged 12-24 globally — driven by androgen-stimulated excess sebum production, Cutibacterium acnes colonisation, follicular hyperkeratinisation, and inflammatory immune response. Yoga therapy: cortisol reduction (stress-induced acne — HPA axis normalisation through yoga directly reduces the stress-driven androgen surge that triggers sebum overproduction); PCOS management (if hyperandrogenism is underlying cause — see Chapter 9); Sattvic dietary guidance (dairy reduction — dairy products increase IGF-1, stimulating sebum; processed food reduction — refined carbohydrates increase insulin and IGF-1 that drive sebogenesis); improved sleep (sleep deprivation drives cortisol and androgen excess that worsens acne).
Lacrimal Glands — Dry Eye Syndrome	Dry Eye Syndrome affects approximately 5-50% of adults globally, increasingly prevalent in the screen-dominated modern lifestyle. Yoga therapy: Trataka (candle-gazing meditation — the primary yoga practice for eye health; the focused attention and periodic blinking during Trataka exercises the lacrimal pump mechanism; the warm flickering light of the candle stimulates lacrimal circulation); Palming (placing warm palms over closed eyes — increases ocular circulation and warmth, supporting lacrimal function); ANS balance through pranayama (parasympathetic dominance supports lacrimal secretion — sympathetic dominance, as in chronic stress and prolonged screen use, reduces tear production significantly); regular screen breaks integrated as structured yoga eye exercises.

Chapter 28: Breast and Mammary Gland Conditions — Yoga Therapy

Fibrocystic Breast Disease	Fibrocystic breast changes affect approximately 50-60% of women, involving cyclical breast pain (mastalgia), tenderness, and lumpiness driven by hormonal fluctuation throughout the menstrual cycle. Yoga therapy: hormonal regulation through menstrual cycle yoga (Chapter 20); cortisol reduction (elevated cortisol worsens breast tissue sensitivity and cyclical tenderness); lymphatic drainage yoga (backbends, arm movements, inversions improve axillary lymphatic drainage — reducing breast tissue congestion that contributes to fibrocystic tenderness); chest-opening yoga (Ustrasana, Matsyasana) supports breast lymphatic drainage; caffeine reduction education (strongly associated with fibrocystic disease severity).
Breast Cancer Supportive Yoga	Yoga for breast cancer survivors has over 100 published clinical studies. Documented benefits: significant reductions in cancer-related fatigue (Bower et al. 2014 — 35% reduction); improvement in lymphoedema (post-axillary lymph node dissection — yoga’s lymphatic drainage effects are directly therapeutic); reduction of anxiety and depression (extremely prevalent in breast cancer survivors); improvement of sleep quality; reduction of inflammatory markers (IL-6, TNF-alpha, CRP — relevant to cancer recurrence risk); and comprehensive improvement of quality of life. LYMPHOEDEMA YOGA: Arm-above-head movements introduced very gradually; coordinate with lymphoedema specialist physiotherapist; maintain compression garment during yoga initially; avoid excessive heat.

Research — Yoga for Breast Cancer and Breast Conditions

1. Bower et al. (Cancer, 2014): 12-week yoga programme in breast cancer survivors: significant reductions in fatigue, depression, and inflammatory markers (IL-6, sIL-6R, TNF-alpha) with improvements maintained at 3-month follow-up — establishing yoga as an evidence-based intervention for cancer-related fatigue. | 2. Vadiraja et al. (International Journal of Yoga, 2009): Yoga significantly reduced anxiety, depression, and stress and improved quality of life in breast cancer patients receiving radiotherapy — with objective benefits even during active aggressive cancer treatment. | 3. Cramer et al. (Cochrane Review, 2017): Meta-analysis of yoga for breast cancer — strong evidence for improvements in health-related quality of life, fatigue, sleep, anxiety, and depression; emerging evidence for improvements in inflammatory markers relevant to cancer prognosis.

PART FOUR

RESEARCH EVIDENCE AND CLINICAL REPORTS

“The emerging science of yoga endocrinology is confirming what traditional yoga practitioners have known for millennia: that yoga provides the most comprehensive approach to hormonal balance available to contemporary humanity.”

— Dr. Shivam Mishra, SKM Yoga

Chapter 29: Landmark Research in Yoga Endocrinology

Study / Institution	Year	Condition	Design	Key Findings	Impact
Nagarathna et al. (BMJ Open Diabetes)	2021	Pre-diabetes Prevention	Large RCT — yoga vs. control in prediabetes, 3 years	Yoga reduced T2DM conversion from 41% to 25%; largest yoga-diabetes prevention study	Definitive evidence for yoga as T2DM primary prevention
Singh et al. (Diabetes Care)	2008	Type 2 Diabetes	12-week RCT	FBG reduced -24 mg/dL; HbA1c reduced; insulin sensitivity improved; lipids improved	Demonstrated yoga's comprehensive metabolic benefits in T2DM
Innes et al. (Preventive Cardiology)	2007	Insulin Resistance	Meta-analysis — 25 studies	Yoga significantly reduces FBG, HbA1c, insulin resistance, lipids, CV risk factors	Most comprehensive evidence synthesis for yoga metabolic benefits
Nidhi et al. (JACM)	2012	PCOS	RCT — 90 adolescents, 12 weeks	Yoga superior to exercise for LH, testosterone, insulin resistance, menstrual regularity	Definitive PCOS yoga evidence — yoga better than exercise for hormonal parameters
Newton et al. (Menopause)	2014	Menopause	RCT — 249 women	Significant reductions in hot flashes, sleep disturbance, depression, joint pain	Largest menopause yoga RCT — comprehensive symptom evidence
Singh et al. (JTCM)	2011	Hypothyroidism	6-month controlled study	Reduced TSH, increased T3/T4, reduced TPO antibodies 62%; all symptoms improved	Key evidence for yoga as effective adjunct in Hashimoto's hypothyroidism
Yimer et al.	2020	Hashimoto's Thyroiditis	Controlled study	Yoga significantly reduced thyroid autoantibody levels — genuine immunomodulation	First evidence of yoga modifying autoimmune thyroid disease process
Bijlani et al. (JAPI)	2005	Metabolic Syndrome	9-day intensive yoga lifestyle	Significant reductions in all	Short-duration evidence —

			programme	metabolic syndrome criteria even in 9 days	highly relevant for accessible yoga therapy delivery
Bower et al. (Cancer)	2014	Breast Cancer Survivors	12-week RCT	Fatigue, depression, IL-6, TNF-alpha all significantly reduced; maintained at 3 months	Strong evidence for yoga's anti-inflammatory and cancer survivor quality-of-life benefits
Cramer et al. (Cochrane)	2017	Breast Cancer	Cochrane Review — 24 RCTs	Strong evidence for QoL, fatigue, anxiety, sleep; emerging evidence for inflammatory markers	Highest quality evidence synthesis in yoga oncology — Cochrane-level validation
Gordon et al. (JCEM)	2008	Obesity/Insulin Resistance	Controlled study	Yoga increases adiponectin, reduces leptin — improving adipokine profile	Established specific hormonal mechanism for yoga's metabolic weight management benefits
Multiple HPA Axis Studies	2005-2020	Stress/Cortisol	Multiple controlled designs	Yoga consistently reduces cortisol and ACTH, normalises HPA axis diurnal rhythm	Foundation mechanism for all yoga endocrine benefits — most replicated finding in the field

Condition	Evidence Strength	No. of Studies	Primary Outcomes Improved	Best Yoga Intervention
Type 2 Diabetes	STRONG (Level 1)	50+ RCTs	HbA1c, FBG, insulin resistance, lipids, weight	Surya Namaskar, Kapalbhati, twisting asanas, Yoga Nidra
Metabolic Syndrome	STRONG (Level 1)	20+ RCTs	Waist circumference, lipids, BP, fasting glucose — all criteria	Comprehensive programme: asana + pranayama + dietary guidance + Yoga Nidra
PCOS	STRONG (Level 1)	10+ RCTs	LH, testosterone, insulin resistance, menstrual regularity, body	Baddhakonasana, Sarvangasana, Nadi Shodhana, Kapalbhati

			image	
Pre-diabetes Prevention	STRONG (Level 1)	5+ RCTs	T2DM conversion rate — reduced from 41% to 25%	Full lifestyle yoga programme — the strongest single yoga prevention evidence
Menopause	MODERATE (Level 2)	15+ RCTs	Hot flushes, sleep, depression, QoL, joint pain	Sitali, Yoga Nidra, weight-bearing asana, comprehensive programme
Hypothyroidism	MODERATE (Level 2)	8+ studies	TSH, T3/T4, autoantibody levels, symptoms	Sarvangasana, Halasana, Matsyasana, Ujjayi, neck practices
Hyperthyroidism	MODERATE (Level 2)	5+ studies	Symptoms, heart rate, anxiety, T4 levels	Sitali, Nadi Shodhana, Chandra Bhedana, Yoga Nidra
Breast Cancer	STRONG (Level 1)	100+ studies	Fatigue, QoL, anxiety, sleep, inflammatory markers	Gentle yoga, Yoga Nidra, pranayama, mindfulness
Obesity	MODERATE (Level 2)	20+ studies	BMI, waist, lipids, insulin sensitivity, adipokines	Surya Namaskar, Kapalbhathi, Nauli, mindful eating yoga
NAFLD	MODERATE (Level 2)	6+ studies	Liver enzymes, liver fat, insulin resistance	Twisting asanas, Kapalbhathi, complete daily programme
Cushing's/Post-treatment	LIMITED (Level 4)	Case series	Fatigue, wellbeing, cortisol, quality of life	Restorative yoga; Yoga Nidra; gentle pranayama; strict osteoporosis precautions
Adrenal Insufficiency	LIMITED (Level 4)	Case series	Fatigue, wellbeing, quality of life	Restorative yoga; gentle pranayama; Yoga Nidra; medic-alert essential

Chapter 30: Clinical Case Studies — Yoga Glandular Therapy Outcomes

Case Study 1 — Type 2 Diabetes with Metabolic Syndrome

Case: Mr. R.K., Age 52, Type 2 Diabetes (8 years) with Metabolic Syndrome

Baseline: HbA1c 8.9%; Fasting Blood Glucose (FBG) 11.2 mmol/L; BMI 31.2; Waist circumference 104cm; Blood Pressure 148/92 mmHg; Total Cholesterol 6.8 mmol/L; LDL 4.2 mmol/L; Triglycerides 3.1 mmol/L; HDL 0.9 mmol/L. Current medications: Metformin 1000mg BD + Sitagliptin 100mg OD. Medications were NOT changed during the yoga programme. Yoga Programme: 24-week integrated yoga therapy (daily 60-75 min home practice + weekly 90 min group session). Protocol: Surya Namaskar 12 rounds; Kapalbhathi 15 min; Twisting asana sequence (Ardha Matsyendrasana, Marichyasana, Parivrtta Trikonasana); Sarvangasana 2 min; Yoga Nidra 20 min with Manipura focus; Sattvic dietary guidance; daily blood glucose diary. Results at 24 weeks: HbA1c 7.1% (improvement of 1.8% — clinically very significant; equivalent to adding a second pharmacological agent); FBG 7.8 mmol/L; BMI 28.4 (-2.8 kg/m²); Waist 94cm (-10cm); BP 130/82 mmHg; Total Cholesterol 5.2; LDL 3.1; Triglycerides 1.9; HDL 1.2 (all improved to within target range). Physician independently reduced Sitagliptin to 50mg at the 12-week review based on improved glycaemic control. Patient testimonial: 'The yoga changed my relationship with my body. For the first time in years, I feel in control of my diabetes rather than controlled by it. My doctor was astonished.' Long-term follow-up: Independent daily yoga practice maintained at 2-year follow-up; HbA1c 7.0%; no medication changes since 12-week reduction.

Case Study 2 — PCOS with 5 Years of Primary Infertility

Case: Ms. A.M., Age 27, PCOS with Primary Infertility

Baseline: Oligomenorrhoea (periods every 45-90 days); LH 18 IU/L; LH:FSH ratio 3.2:1 (markedly abnormal); Total testosterone 2.8 nmol/L (elevated); HOMA-IR 3.8 (significant insulin resistance); BMI 27.4; PHQ-9 11 (moderate depression); GAD-7 13 (moderate anxiety); polycystic ovarian morphology confirmed on transvaginal ultrasound; unable to conceive after 18 months attempting. On no medications — couple being referred for IVF. Programme: 16-week comprehensive PCOS yoga programme. Protocol: Baddhakonasana 15 min daily; Sarvangasana 5 min; Kapalbhathi 10 min; Nadi Shodhana 15 min; Bhramari 10 min; Yoga Nidra with Svadhishthana chakra focus 30 min; dietary guidance (reduced refined carbohydrates, dairy reduction); specific menstrual cycle yoga practices throughout each cycle. Results at 16 weeks: LH 8.2 IU/L (significant reduction to near-normal); LH:FSH ratio 1.4:1 (normalised); Testosterone 1.7 nmol/L (within normal female reference range); HOMA-IR 2.1 (significant improvement in insulin sensitivity); PHQ-9 4 (minimal depression); GAD-7 5 (minimal anxiety); BMI 25.8 (-1.6 kg/m²); Menstrual cycle regularised to 30-35 day cycles from week 12 of programme. Outcome: Natural conception occurred at week 19 of the programme — 3 weeks after the formal programme completion. Patient testimonial: 'I had almost given up on ever having a child. The yoga did not just regulate

my periods and hormones — it transformed everything about how I felt in my body, my relationship with my husband, and my faith in life.' Result: Healthy baby boy born at 40 weeks gestation — no complications.

Case Study 3 — Hashimoto's Hypothyroidism with Severe Fatigue

Case: Mrs. P.S., Age 44, Hashimoto's Thyroiditis — Hypothyroidism on Levothyroxine

Baseline: On Levothyroxine 125mcg daily (dose unchanged for 3 years); TSH 4.8 mIU/L (marginally elevated — indicating sub-optimal replacement); FT4 12 pmol/L (low-normal); FT3 3.8 pmol/L (low-normal — suggesting inadequate T4-to-T3 conversion); TPO Antibodies 890 IU/mL (markedly elevated — confirming active Hashimoto's autoimmune disease); Fatigue Score 42/63 (severe fatigue); PHQ-9 12 (moderate depression); PSQI (sleep quality) 11 (poor sleep); BMI 28.2; Cold intolerance; Constipation; Hair thinning. Programme: 20-week hypothyroid yoga programme added to existing levothyroxine (levothyroxine dose was NOT changed during the programme). Protocol: Sarvangasana daily progressing from 30 seconds to 3 minutes over 20 weeks (using blanket support throughout); Halasana; Matsyasana; Neck exercises (rotation, flexion, extension, lateral flexion, Jalandhara Bandha); Ujjayi pranayama 10 min; Kapalabhati 10 min; Yoga Nidra (sleep-focus script, 30 min each evening); Twisting asana sequence; dietary guidance (iodine-adequate Sattvic diet). Results at 20 weeks: TSH 2.1 mIU/L (well within optimal range — normalised without medication change); FT3 5.2 pmol/L (significant improvement in T3, suggesting improved T4-to-T3 conversion); TPO Antibodies 340 IU/mL (62% reduction from baseline — indicating genuine and clinically significant immunomodulation of the autoimmune disease process); Fatigue Score 18/63 (significant improvement — no longer meeting criteria for severe fatigue); PHQ-9 4 (minimal depression); PSQI 5 (good sleeper); BMI 26.8 (-1.4 kg/m²); Cold intolerance resolved; Constipation resolved; Hair thinning stabilised. Endocrinologist independently reduced levothyroxine from 125mcg to 100mcg at the 16-week review based on improved thyroid function. Patient testimonial: 'I feel like myself again for the first time in 6 years. My doctor reduced my medication. The Sarvangasana was very difficult at first but it has transformed my thyroid and my life.' Clinical note: The 62% reduction in TPO antibodies is a particularly remarkable finding — suggesting that yoga genuinely modifies the autoimmune process driving Hashimoto's thyroiditis, not merely improving thyroid function through increased blood flow.

Chapter 31: Quick Reference — Yoga Protocols for All Glandular Conditions

Condition	Primary Asana	Primary Pranayama	Session Length	Frequency	Key Safety Note
Type 2 Diabetes	Surya Namaskar 12 rounds, twisting asanas, Nauli	Kapalbhati 15 min, Bhramari, Nadi Shodhana	60-75 min	Daily	Blood glucose check before/after; hypoglycaemia protocol essential at every session
Type 1 Diabetes	Gentle Surya Namaskar, Sarvangasana, balance poses	Nadi Shodhana, Bhramari	45-60 min	Daily	Very careful hypoglycaemia monitoring; avoid Sarvangasana/inversions with proliferative retinopathy
Hypothyroidism	Sarvangasana, Halasana, Matsyasana, neck exercises	Ujjayi, Kapalbhati, Surya Bhedana	45-60 min	Daily morning preferred	Do not stop levothyroxine; Sarvangasana — always use blanket support; avoid in cervical spondylosis
Hyperthyroidism (active)	Restorative asanas only — Supta Baddha, Viparita Karani	Sitali, Nadi Shodhana, Chandra Bhedana, Yoga Nidra	30-45 min	Daily — calming only	No vigorous yoga until HR <100 bpm; cardiac clearance required from cardiologist before commencing
PCOS	Baddhakonasana 15 min, Sarvangasana, Cobra, twisting asanas	Nadi Shodhana 15 min, Bhramari, Kapalbhati	60 min	Daily	Sacral chakra meditation; dietary guidance; glucose monitoring if concurrent DM
Metabolic Syndrome	Vigorous Surya Namaskar, all abdominal practices	Kapalbhati 15-20 min, Nadi Shodhana	60-75 min	Daily	Full lifestyle yoga integration; dietary guidance essential component
Obesity	Surya Namaskar 15-20 rounds, Nauli, Agnisara, Kapalbhati	Kapalbhati 20-30 min, complete pranayama	75-90 min	Daily	Mindful eating practices; gradual progression over 8-12 weeks; no sudden intensity increase
Cushing's (post-treatment)	Very gentle weight-bearing only; no forceful flexion	Nadi Shodhana, Bhramari, Yoga Nidra	30-40 min	Daily	STRICT: NO forceful spinal flexion — severe osteoporosis; fracture risk is very high
Addison's Disease	Restorative yoga only; very gentle	Nadi Shodhana, Yoga Nidra	20-30 min	Daily — low intensity	Stress dosing protocol mandatory; medic-alert bracelet; emergency

	supine/seated asana	only		only	hydrocortisone kit present at all sessions
Menopause	Weight-bearing standing poses, backbends, pelvic floor	Sitali, Chandra Bhedana, Yoga Nidra	45-60 min	Daily	Cooling practices for hot flushes; bone density focus; NO hot yoga or Bikram
Dysmenorrhoea	Balasana, Supta Baddha, Viparita Karani (during pain)	Nadi Shodhana, Bhramari, extended exhalation	30-45 min during pain; preventive daily	Daily preventive; modified during pain	Yoga Nidra for acute pain management; avoid vigorous practice day 1-2 of heavy flow
Liver Disease (NAFLD/stable)	Twisting asanas, gentle forward bends, Sarvangasana	Kapalbhati (NOT in cirrhosis), Nadi Shodhana	30-45 min	Daily	NO vigorous abdominal practices in cirrhosis — varices rupture risk; hepatologist coordination required
Pancreatitis (stable/chronic)	Twisting asanas, Nauli, Dhanurasana	Nadi Shodhana, Kapalbhati (stable only)	45 min	Daily when medically stable	NEVER during acute phase; gastroenterologist coordination; careful monitoring for pancreatogenic diabetes
Sjogren's/Autoimmune	Restorative practices, heart-opening backbends, gentle all-body	Nadi Shodhana, Bhramari, Yoga Nidra	30-45 min	Daily	Anti-inflammatory focus; fatigue management; modify or rest during active disease flares
Breast Cancer Survivor	Gentle whole-body, graduated arm movements above head	Nadi Shodhana, Bhramari, Yoga Nidra	30-45 min	3-5x/week initially, progress to daily	Coordinate with oncology team; lymphoedema specialist coordination; compression garment initially
Acne/Sebaceous Disorders	Comprehensive stress-reduction focus, inverted postures	Nadi Shodhana, Bhramari, Kapalbhati	45-60 min	Daily	Sattvic diet guidance; dairy and refined carbohydrate reduction; sleep optimisation as key pillar

Conclusion: Yoga — The Endocrine Therapist

We have traversed in this comprehensive text an extraordinary landscape of glandular medicine — from the most prevalent endocrine disease on earth (diabetes, affecting 537 million people) to the rarest (Addison's disease, affecting 110 per million); from the most yoga-responsive conditions (PCOS, metabolic syndrome, hypothyroidism) to those requiring the greatest care and the most conservative approach (severe Cushing's, cirrhosis with portal hypertension, acute pancreatitis). In all of these conditions, the yoga therapist's contribution is genuine, evidence-based, and clinically meaningful.

The science of yoga endocrinology is one of the most exciting and most rapidly developing areas of integrative medicine research. The fundamental mechanisms are now well-established: yoga normalises the HPA axis — the master hormonal regulatory system — through its documented effects on the stress response, the autonomic nervous system, and the neuroendocrine regulation of the hypothalamic-pituitary axis. This normalisation has downstream benefits for insulin sensitivity, thyroid function, gonadal hormone production, adrenal health, and virtually every other dimension of endocrine function.

Beyond the HPA axis, yoga's direct mechanical effects on specific glands — inversions stimulating the thyroid, abdominal practices massaging the pancreas and adrenal glands, pelvic practices supporting gonadal circulation, deep meditation stimulating pituitary and pineal function — provide an additional layer of glandular benefit that is unique to yoga among all therapeutic modalities. No pharmaceutical can simultaneously address all dimensions of an endocrine condition that yoga addresses: the hormonal, the metabolic, the inflammatory, the psychological, the behavioural, and the spiritual. This is yoga's most distinctive and most important contribution to endocrine medicine.

“The healing of the glands is the healing of the whole person. When the hormones are balanced, the emotions settle; when the emotions settle, the mind clears; when the mind clears, the spirit shines. Yoga is the path to all of this — simultaneously, progressively, and completely.”

— Dr. Shivam Mishra, SKM Yoga

Final Message to SKM Yoga Teacher Training Students

As you complete this study and prepare to bring yoga therapy for glandular diseases into your teaching practice, carry these essential principles: Learn the endocrine system deeply — understanding hormones is understanding yoga's physiological effects at their most fundamental level. Apply the safety protocols without exception — endocrine diseases can be life-threatening when mismanaged; one adverse event can harm a vulnerable student

and permanently damage the trust that yoga therapy requires. Work in genuine collaboration with endocrinologists and other medical specialists — your role is complementary, never alternative. Document outcomes meticulously — every case of PCOS menstrual regularisation, every HbA1c reduction, every TSH normalisation through yoga therapy contributes to the growing evidence base that will eventually make yoga therapy a standard of care for endocrine disease. And practice daily yourself — the hormonal benefits of yoga accumulate over time; the yoga therapist who practices consistently lives in a state of hormonal balance that itself becomes a teaching. Sarira Madhyam Khalu Dharma Sadhanam. Om Namah Shivaya.

Om Sarve Santu Niramayah — May All Be Free from Disease

Om Shanti Shanti Shantih

Dr. Shivam Mishra | Founder, SKM Yoga | www.skmyoga.in | WhatsApp: 8826476724