RUHANI COLLEGE
OF HEALTH BUSINESS AND TECHNOLOGY

RU RMT 17 Endocrinology

Survey of the Endocrine Glands and Their Hormones

Lecture 02 of 06

Registered Massage Therapy Diploma Program · RU RMT 17 Endocrinology

Aligned to FOMTRAC Inter-Jurisdictional Practice Competencies (2016), CMTO Standards of Practice, and the Regulated Health Professions Act, 1991

Prerequisite: Lecture 01 — hormone classes, mechanisms of action and feedback control

How This Session Works

- **Purpose:**
- This is the map of the territory. Every gland introduced today is examined in depth in Lectures 03 to 06.
- **Method:**
- Gland by gland — location, hormone, action, and the single most important clinical consequence for a massage therapist.
- **Second half:**
- Medication recognition on intake. Learning to read a patient's medication list is one of the most practical skills in this course.
- **What to memorize today:**
- The gland-hormone-target-effect grid. It appears in every subsequent lecture and on every assessment.
- **What not to do:**
- Do not attempt to memorize every clinical detail at this stage. Build the framework now; the detail is added later.
- **Recurring reminder:**
- An RMT recognizes, modifies, documents and refers. An RMT does not diagnose, interpret laboratory results, or advise on medication.

Learning Objectives (1 of 2)

- By the end of this session, the student will be able to:
  - Locate each major endocrine gland by surface and skeletal landmark.
  - Name the principal hormone or hormones secreted by each gland and state their main target tissue and physiological effect.
  - Identify organs with a secondary endocrine role and the hormones they produce.
  - Correlate specific hormones with their effects on the musculoskeletal, integumentary, cardiovascular and nervous systems.
  - Explain why endocrine disorders produce systemic rather than localized presentations.

Learning Objectives (2 of 2)

- Recognize common endocrine medications on a health history and state what each one indicates about the patient's underlying condition.
- Identify endocrine red flags during intake and screening and select the appropriate professional response.
- Apply gland-specific palpation and positioning cautions, particularly for the anterior neck and for patients with reduced bone density.
- Document endocrine findings, treatment modifications and referral advice in accordance with the CMTO Standard of Practice on record keeping.
- Justify treatment modifications by reference to the underlying endocrine physiology rather than to protocol alone.

Key Terminology

Anatomical and functional

- **Neuroendocrine organ:**
- Nervous tissue that secretes hormones; the hypothalamus and the posterior pituitary.
- **Tropic hormone:**
- A hormone whose target is another endocrine gland.
- **Axis:**
- A three-tier control chain of hypothalamus, pituitary and a peripheral gland.
- **Islets of Langerhans:**
- The endocrine tissue scattered through the exocrine pancreas.
- **Follicle (thyroid):**
- The spherical functional unit storing colloid.
- **Zona:**
- A histological layer of the adrenal cortex.

Clinical

- **Goitre:**
- Visible enlargement of the thyroid gland, from any cause.
- **Hypoglycemia:**
- Blood glucose below the normal range; an acute emergency.
- **Osteoporosis:**
- Reduced bone mass and disrupted microarchitecture with increased fracture risk.
- **Corticosteroid:**
- A synthetic analogue of adrenal cortical hormones used therapeutically.
- **Local contraindication:**
- A site that must be avoided while the rest of the body may be treated.
- **Absolute contraindication:**
- A condition under which massage must not be given at all until cleared.

Section 1

The Cranial Glands: Hypothalamus, Pituitary and Pineal

- The hypothalamus as the bridge between the nervous and endocrine systems
- The pituitary gland and its two functionally distinct lobes
- The pineal gland, melatonin and circadian rhythm
- Clinical implications for sleep, stress and chronic pain presentations

The Hypothalamus

- **Location:**
- The floor and lower walls of the third ventricle, inferior to the thalamus and superior to the pituitary gland, to which it is joined by the infundibulum.
- **Dual nature:**
- It is nervous tissue that also functions as an endocrine gland, making it the anatomical and functional bridge between the two control systems.
- **Releasing hormones:**
- Growth hormone-releasing hormone, thyrotropin-releasing hormone, corticotropin-releasing hormone and gonadotropin-releasing hormone, all delivered to the anterior pituitary through the hypophyseal portal system.
- **Inhibiting hormones:**
- Growth hormone-inhibiting hormone (somatostatin) and prolactin-inhibiting hormone (dopamine).
- **Directly synthesized hormones:**
- Antidiuretic hormone and oxytocin, manufactured in hypothalamic neurons and transported down axons for storage in the posterior pituitary.
- **Non-endocrine functions:**
- Thermoregulation, thirst, hunger and satiety, sleep-wake cycle, autonomic control and emotional response.
- **Clinical relevance:**
- Persistent psychological or physiological stress keeps the hypothalamic-pituitary-adrenal axis activated. Patients with chronic pain, chronic fatigue and fibromyalgia frequently show altered stress-axis regulation (Chrousos, 2009).

The Pituitary Gland

Anterior pituitary (adenohypophysis)

- Glandular epithelial tissue; synthesizes and secretes its own hormones.
- Controlled hormonally through the hypophyseal portal blood supply.
- **Growth hormone:**
- protein synthesis, cell division, bone and muscle growth, tissue repair.
- **Thyroid-stimulating hormone:**
- drives thyroid output of T3 and T4.
- **Adrenocorticotropic hormone:**
- drives cortisol output from the adrenal cortex.
- **Prolactin:**
- milk production after birth.
- Follicle-stimulating hormone and luteinizing hormone: gonadal function and sex steroid output.

Posterior pituitary (neurohypophysis)

- Neural tissue; an extension of the hypothalamus, not a true gland.
- Stores and releases two hormones made in the hypothalamus; synthesizes nothing itself.
- Controlled neurally, by action potentials travelling down hypothalamic axons.
- **Antidiuretic hormone:**
- reduces urine output, conserves water, supports blood volume and pressure.
- **Oxytocin:**
- uterine contraction in labour, milk ejection in lactation, and a role in social bonding and affiliative behaviour.
- **Clinical note:**
- Because the two lobes differ in tissue type and control mechanism, they fail independently.

The Pineal Gland

- **Location:**
- A small cone-shaped structure on the roof of the third ventricle, in the epithalamus.
- **Hormone:**
- Melatonin, synthesized from the amino acid tryptophan by way of serotonin.
- **Control:**
- Light striking the retina signals the suprachiasmatic nucleus of the hypothalamus, which suppresses melatonin production. Darkness releases the inhibition and melatonin rises.
- **Function:**
- Sets the circadian rhythm and promotes sleep onset. It also has antioxidant properties and contributes to timing of reproductive maturation in some species (Arendt & Aulinas, 2022).
- **Clinical relevance in practice:**
- Shift workers, night-shift nurses, long-haul drivers and new parents commonly present with disrupted rhythm, unrefreshing sleep, fatigue and increased musculoskeletal complaint.
- **Practical implication:**
- Growth hormone, which drives tissue repair, is released mainly during slow-wave sleep. A patient whose sleep is fragmented heals more slowly from soft tissue injury, and treatment expectations and home care should be adjusted accordingly.
- **Scope note:**
- Melatonin is available over the counter in Canada, but advising on its use, dose or timing is outside the RMT scope of practice. Refer to a pharmacist or physician.

Section 2

The Cervical and Thoracic Glands

- **The thyroid gland:**
- location, hormones and metabolic role
- The parathyroid glands and calcium regulation
- The thymus and immune development
- Anterior neck palpation cautions for the massage therapist

The Thyroid Gland

- **Location:**
- Anterior neck, inferior to the larynx, wrapped around the trachea. Two lateral lobes joined by an isthmus across the second and third tracheal rings.
- **Distinction:**
- It is the largest purely endocrine gland in the body and the only one that stores large quantities of its hormone extracellularly, in colloid within follicles.
- **T4 (thyroxine) and T3 (triiodothyronine):**
- Set the basal metabolic rate, generate body heat, and are essential for normal growth and for nervous system development in children.
- **Iodine dependence:**
- Both hormones require dietary iodine. Deficiency prevents synthesis and produces goitre.
- **Calcitonin:**
- Produced by parafollicular cells, distinct from the follicular cells. It lowers blood calcium by inhibiting osteoclasts; its role in adult human physiology is minor compared with parathyroid hormone.
- **Permissive relationship:**
- Thyroid hormone is permissive for catecholamine action, which is why hyperthyroid patients are heat-intolerant, tremulous and tachycardic while hypothyroid patients are cold and slow.
- **Practice caution:**
- Avoid firm or sustained pressure over the anterior neck. Palpation of the thyroid for diagnostic purposes is not within the RMT scope; visible or palpable enlargement is a referral finding.

The Parathyroid Glands

- **Location:**
- Usually four small glands embedded on the posterior surface of the thyroid lobes. Number and position vary, and ectopic glands occur.
- **Hormone:**
- Parathyroid hormone, a protein hormone released in response to falling plasma calcium — a humoral stimulus.
- **Action on bone:**
- Stimulates osteoclast activity, releasing calcium and phosphate from the bone matrix into blood.
- **Action on kidney:**
- Increases calcium reabsorption and increases phosphate excretion, and activates vitamin D to its hormonal form, calcitriol.
- **Action on intestine:**
- Indirect, through calcitriol, increasing dietary calcium absorption.
- **Why it dominates:**
- Parathyroid hormone is the single most important regulator of plasma calcium in the adult. Loss of it is life-threatening within days; loss of calcitonin is well tolerated.
- **Clinical consequence for the RMT:**
- Sustained parathyroid excess demineralizes bone. A patient with hyperparathyroidism or long-standing renal disease may have fragile bone requiring reduced pressure and avoidance of joint mobilization and heavy rib-cage compression.

The Thymus

- **Location:**
- In the superior mediastinum, deep to the sternum and anterior to the great vessels, extending superiorly toward the thyroid in children.
- **Size across the lifespan:**
- Large and active in infancy and childhood, largest relative to body size at birth, then progressively replaced by adipose and fibrous tissue after puberty.
- **Hormones:**
- Thymosin and thymopoietin, which direct the maturation of T lymphocytes.
- **Function:**
- Immunological education. T cells that would attack the body's own tissues are eliminated here, establishing self-tolerance.
- **Relevance to endocrinology:**
- Failure of self-tolerance underlies the autoimmune endocrine diseases that dominate clinical practice — Hashimoto's thyroiditis, Graves' disease, type 1 diabetes mellitus and Addison's disease.
- **Practical implication:**
- When you see one autoimmune endocrine diagnosis on an intake form, screen for others. They cluster in the same patient and in the same family.

Anterior Neck: What Is and Is Not Appropriate

Cautions and avoidances

- Avoid firm, sustained or bilateral pressure on the anterior triangle of the neck.
- Do not compress the carotid sinus region; baroreceptor stimulation can produce bradycardia and syncope.
- Do not attempt to palpate, mobilize or evaluate the thyroid gland; assessment of a gland is a diagnostic act outside the RMT scope of practice.
- Avoid deep anterior neck work entirely in a patient with a known goitre, thyroid nodule, previous thyroid surgery or radiotherapy to the neck.
- Report visible swelling, a new lump, hoarseness lasting more than a few weeks, or difficulty swallowing, and refer.

What remains appropriate

- Treatment of posterior and lateral cervical musculature within patient tolerance.
- Gentle work on sternocleidomastoid and scalenes with the patient's informed consent, avoiding sustained anterior compression.
- Positioning modifications for patients who cannot lie flat comfortably.
- Careful documentation of any anterior neck finding and of the advice given.
- Explaining to the patient why you are avoiding an area — this is part of informed consent under the Health Care Consent Act, 1996.

Section 3

The Abdominal Glands

- **The adrenal glands:**
- cortex and medulla
- The pancreatic islets and glucose homeostasis
- The kidneys as endocrine organs
- Clinical priorities for the massage therapist

The Adrenal Glands

Adrenal cortex (outer, glandular)

- Three histological zones from superficial to deep: zona glomerulosa, zona fasciculata, zona reticularis.
- **Zona glomerulosa:**
- mineralocorticoids, principally aldosterone — sodium retention, potassium excretion, blood volume and pressure.
- **Zona fasciculata:**
- glucocorticoids, principally cortisol — raises blood glucose, mobilizes fuel, suppresses inflammation and immune activity.
- **Zona reticularis:**
- adrenal androgens, weak precursors converted peripherally to testosterone or estrogen.
- All are steroid hormones synthesized from cholesterol; all act by direct gene activation.

Adrenal medulla (inner, neural)

- Modified sympathetic postganglionic neurons; effectively a specialized sympathetic ganglion.
- Secretes epinephrine (about 80 per cent) and norepinephrine into blood.
- Triggered neurally by sympathetic preganglionic fibres during the acute stress response.
- **Effects:**
- increased heart rate and force, bronchodilation, blood redirected to skeletal muscle, glucose and fatty acid release, pupil dilation.
- **Clinical note:**
- These are the amine hormones, so the response is immediate and brief, unlike the sustained cortisol response.

The Pancreas

- **Location:**
- Retroperitoneal, extending from the duodenal curve across the posterior abdominal wall toward the spleen, at approximately the level of the first and second lumbar vertebrae.
- **Dual function:**
- The exocrine portion, about 98 per cent of the organ, secretes digestive enzymes through the pancreatic duct. The endocrine portion, the islets of Langerhans, secretes hormones into blood.
- Beta cells (about 70 per cent of islet cells): Insulin. Lowers blood glucose by promoting uptake into skeletal muscle and adipose tissue and glycogen storage in the liver.
- **Alpha cells (about 20 per cent):**
- Glucagon. Raises blood glucose by stimulating hepatic glycogen breakdown and gluconeogenesis.
- **Delta cells:**
- Somatostatin, which inhibits both insulin and glucagon and slows nutrient absorption.
- **Antagonistic pairing:**
- Insulin and glucagon are the primary antagonistic pair defending the blood glucose set point.
- **Clinical priority:**
- Diabetes mellitus is the endocrine condition an Ontario RMT will meet most often. Screening for it, recognizing hypoglycemia, avoiding injection and pump sites, and inspecting the feet of a patient with neuropathy are core competencies covered in Lecture 05.

The Kidneys and Other Abdominal Endocrine Tissue

- **Erythropoietin:**
- Secreted by the kidney in response to low oxygen delivery; stimulates red blood cell production in bone marrow. Chronic kidney disease therefore causes anemia and marked fatigue.
- **Renin:**
- An enzyme released by the juxtaglomerular apparatus in response to low renal perfusion; initiates the renin-angiotensin-aldosterone system, which raises blood pressure and conserves sodium and water.
- **Calcitriol activation:**
- The final activation step of vitamin D occurs in the kidney under the influence of parathyroid hormone. Renal failure therefore disrupts calcium balance and bone quality even when dietary intake is adequate.
- **Stomach and small intestine:**
- Gastrin, secretin, cholecystokinin and ghrelin coordinate digestion and appetite.
- **Adipose tissue:**
- Leptin signals long-term energy stores to the hypothalamus; adiponectin improves insulin sensitivity. Adipose tissue is now recognized as an endocrine organ in its own right, which is central to understanding type 2 diabetes.
- **Clinical synthesis for the RMT:**
- A patient with chronic kidney disease may present with anemia, hypertension, fragile bone and peripheral neuropathy simultaneously. All four change your treatment plan.

Section 4

The Gonads, Placenta and Other Endocrine Tissues

- Ovaries and testes
- The placenta as a temporary endocrine organ
- The heart, skin and bone as endocrine tissue
- Life-stage hormonal change and its musculoskeletal consequences

The Gonads

Ovaries

- **Location:**
- In the ovarian fossa on the lateral pelvic wall, attached by the ovarian ligament and mesovarium.
- **Estrogen:**
- Maturation of reproductive organs, secondary sex characteristics, and maintenance of bone density by restraining osteoclast activity.
- **Progesterone:**
- Prepares and maintains the endometrium; predominates in the second half of the cycle and in pregnancy.
- **Inhibin:**
- Suppresses follicle-stimulating hormone, refining cycle control.
- **Relaxin:**
- Rises in pregnancy; increases ligamentous laxity of the pelvis and, systemically, of other joints.
- **Clinical consequence:**
- The fall in estrogen at menopause accelerates bone loss and is the principal driver of postmenopausal osteoporosis.

Testes

- **Location:**
- In the scrotum, held outside the body cavity to maintain a temperature below core temperature.
- **Testosterone:**
- Produced by the interstitial (Leydig) cells under luteinizing hormone stimulation.
- **Effects:**
- Spermatogenesis, secondary sex characteristics, maintenance of skeletal muscle mass, bone density and libido.
- **Inhibin:**
- Produced by the sustentacular (Sertoli) cells; suppresses follicle-stimulating hormone.
- **Age-related change:**
- Testosterone declines gradually from mid-adulthood rather than falling abruptly, with associated loss of muscle mass and bone density.
- **Clinical note:**
- Anabolic steroid use suppresses the patient's own production and alters tendon quality; ask about it when the history does not fit the presentation.

The Placenta and Other Endocrine Tissues

- **The placenta:**
- A temporary endocrine organ of pregnancy. It secretes human chorionic gonadotropin, which maintains the corpus luteum in early pregnancy, and later takes over production of estrogen and progesterone.
- **Consequence for practice:**
- Pregnancy is a state of profound, planned endocrine change. Increased joint laxity, altered blood volume, altered coagulation and altered posture all follow from it, and all change how you position and treat.
- **The heart:**
- Atrial natriuretic peptide is released by atrial cells stretched by high blood volume. It promotes sodium and water excretion, opposing aldosterone and antidiuretic hormone.
- **The skin:**
- Ultraviolet light converts a cholesterol derivative in the epidermis to cholecalciferol, the first step in vitamin D synthesis. In Canadian latitudes, cutaneous synthesis is negligible through the winter months (Health Canada).
- **Bone:**
- Osteocalcin, produced by osteoblasts, influences insulin sensitivity and energy metabolism, illustrating that the skeleton is an endocrine organ and not merely a mechanical structure.
- **Adipose tissue and the gut:**
- As covered earlier, both secrete hormones affecting appetite, energy balance and insulin sensitivity.

Section 5

Integration: Gland, Hormone, Target, Effect

- The master grid of the endocrine system
- Hormone effects grouped by body system
- Why endocrine disease presents systemically

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Master Grid — Part 1: Cranial and Cervical Glands

Gland	Principal hormone(s)	Main target	Principal effect
Hypothalamus	Releasing and inhibiting hormones; ADH and oxytocin	Anterior pituitary; posterior pituitary	Governs the entire endocrine system
Anterior pituitary	GH, TSH, ACTH, PRL, FSH, LH	Bone, muscle, thyroid, adrenal cortex, breast, gonads	Growth, metabolic rate, stress response, reproduction, lactation
Posterior pituitary	ADH; oxytocin	Kidney; uterus and breast	Water conservation; uterine contraction and milk ejection
Pineal	Melatonin	Hypothalamus and widespread	Sets circadian rhythm, promotes sleep onset
Thyroid	T3 and T4; calcitonin	All cells; bone	Sets basal metabolic rate and heat production; lowers blood calcium
Parathyroid	Parathyroid hormone	Bone, kidney, intestine	Raises blood calcium; the dominant calcium regulator
Thymus	Thymosin; thymopoietin	T lymphocytes	Immune maturation and

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Master Grid — Part 2: Abdominal and Pelvic Glands

Gland	Principal hormone(s)	Main target	Principal effect
Adrenal cortex	Aldosterone	Kidney tubule	Retains sodium and water, excretes potassium, raises blood pressure
Adrenal cortex	Cortisol	Most cells	Raises blood glucose, mobilizes fuel, suppresses inflammation
Adrenal cortex	Adrenal androgens	Widespread	Weak androgenic effect; contributes to libido
Adrenal medulla	Epinephrine; norepinephrine	Heart, vessels, airways, liver	Acute fight-or-flight response
Pancreatic islets	Insulin (beta cells)	Muscle, liver, adipose	Lowers blood glucose; the only hormone that does so
Pancreatic islets	Glucagon (alpha cells)	Liver	Raises blood glucose
Kidney	Erythropoietin; renin; calcitriol	Bone marrow; vasculature; intestine	Red cell production; blood pressure; calcium absorption
Ovary	Estrogen; progesterone; inhibin; relaxin	Uterus, breast, bone, ligament	Cycle control, bone maintenance, ligamentous laxity in pregnancy
Testis	Testosterone; inhibin	Reproductive tract, muscle, bone	Spermatogenesis, muscle and bone mass, libido

Hormone Effects Grouped by Body System

Body system	Hormones with major influence	Why it matters in a massage practice
Skeletal	PTH, calcitriol, calcitonin, estrogen, testosterone, cortisol, growth hormone	Determines bone density and therefore safe pressure and whether joint mobilization is appropriate
Muscular	Thyroid hormones, cortisol, testosterone, growth hormone, insulin	Determines muscle bulk, tone, endurance and rate of repair after treatment
Integumentary	Cortisol, thyroid hormones, ACTH, estrogen	Determines skin thickness, fragility, bruising tendency and lubricant choice
Cardiovascular	Aldosterone, ADH, catecholamines, thyroid hormones, ANP	Determines blood pressure stability and risk of orthostatic hypotension after treatment
Nervous	Thyroid hormones, calcium-regulating hormones, insulin, melatonin	Determines sensation, reflexes, alertness and the reliability of patient pressure feedback
Connective tissue	Cortisol, relaxin, estrogen, growth hormone	Determines collagen quality, ligament laxity and joint stability
Immune	Cortisol, thymic hormones	Determines infection risk and healing rate, and affects hygiene and

Why Endocrine Disease Presents Systemically

- **One hormone, many targets:**
- Because a hormone reaches every tissue expressing its receptor, a single gland failure changes several body systems at once.
- **Worked example — untreated hypothyroidism:**
- Fatigue and cold intolerance (metabolic), weight gain (metabolic), dry coarse skin and hair loss (integumentary), constipation (digestive), bradycardia (cardiovascular), delayed relaxation of tendon reflexes and carpal tunnel syndrome (nervous), muscle aching and stiffness (muscular), and low mood (psychological).
- **Consequence for assessment:**
- A patient presenting with bilateral, symmetrical, unexplained symptoms in more than one body system should raise a systemic rather than a local hypothesis.
- **Consequence for treatment planning:**
- You do not treat the endocrine disease. You adjust for its tissue effects — pressure for fragile bone or skin, positioning for cardiovascular instability, duration for reduced tolerance, and hydrotherapy for impaired thermoregulation.
- **Consequence for referral:**
- A systemic pattern that has not been medically investigated is a referral, and you must document that you advised it.
- **Common trap:**
- Attributing a systemic presentation to poor posture or work stress because those are the explanations most patients offer. Ask the screening questions anyway.

Section 6

Reading the Health History

- Endocrine medications and what they reveal
- Screening questions that belong on every intake
- Red flag recognition and the referral pathway
- Two worked case applications

Endocrine Medications an RMT Will See on Intake

Medication or class	Underlying condition it indicates	Treatment-planning implication
Levothyroxine	Hypothyroidism	Ask about stability and symptom control; caution with hydrotherapy extremes if thermoregulation is impaired
Methimazole; propylthiouracil	Hyperthyroidism	Screen for tachycardia, heat intolerance, tremor; avoid heating treatments; keep sessions moderate
Insulin (any type)	Type 1 or advanced type 2 diabetes	Ask about last dose and last meal; avoid injection and pump sites; keep fast-acting carbohydrate available
Metformin and other oral hypoglycemics	Type 2 diabetes	Screen for neuropathy and impaired healing; inspect feet; adjust pressure where sensation is reduced
Prednisone and other oral corticosteroids	Autoimmune or inflammatory disease; adrenal insufficiency	Expect fragile skin, easy bruising, reduced bone density and slow healing; reduce pressure and duration
Corticosteroid injection to a joint or tendon	Local inflammatory condition	Local contraindication to deep work at the site; repeated injections weaken local collagen
Bisphosphonates (alendronate, risedronate)	Osteoporosis	Reduced bone density; modify pressure, avoid joint mobilization and heavy compression over the thorax and spine
Hormone therapy; oral contraceptives	Menopausal symptoms; contraception; cycle regulation	Note any history of clotting disorder; screen for signs of deep vein thrombosis before lower limb work
Desmopressin	Deficiency of antidiuretic hormone	Plan for bathroom access and hydration; keep

Screening and Referral

Questions that belong on every intake

- Have you been diagnosed with any condition affecting your thyroid, adrenal glands, pancreas or pituitary gland?
- Do you take insulin or any medication for blood sugar? When did you last take it and last eat?
- Have you taken oral steroids such as prednisone for more than a few weeks at any time?
- Have you been told you have low bone density or osteoporosis, or had a fracture from a minor fall?
- Have you had any unexplained change in weight, appetite, thirst, energy, temperature tolerance or sleep?
- Do you have numbness, tingling or reduced sensation anywhere, particularly in the feet?
- Are you pregnant, or could you be?

The referral pathway

- Record the finding in the patient's own words. Do not paraphrase it into a diagnostic term.
- Do not name or suggest a diagnosis. Under the Regulated Health Professions Act, 1991 communicating a diagnosis is a controlled act not authorized to massage therapists.
- Advise the patient to see their physician or nurse practitioner, and note the date you gave that advice.
- Decide whether to treat, modify or defer, and record the reasoning.
- Obtain and document informed consent for whatever treatment you do provide.
- With written consent, you may communicate directly with the physician. Disclosure without consent breaches the Personal Health Information Protection Act, 2004.
- Follow up at the next visit and document the outcome.

Case Application 1 — The Medication List That Changes the Plan

- **Presentation:**
- A 67-year-old woman books for thoracic and shoulder stiffness. She reports no medical problems, but her medication list includes alendronate, levothyroxine and calcium with vitamin D.
- **What the list tells you:**
- Alendronate is a bisphosphonate used for osteoporosis; levothyroxine indicates hypothyroidism. Neither appeared in her account of her health, which is common — patients frequently do not consider a controlled condition to be a medical problem.
- **Clinical reasoning:**
- Reduced bone density means the thoracic spine and ribs are vulnerable. Heavy compressive techniques, sustained prone pressure over the thorax and any thoracic joint mobilization are inappropriate.
- **Treatment modification:**
- Moderate pressure, side-lying or supported prone positioning, no rib springing, no high-velocity techniques, and careful attention to how she moves on and off the table.
- **Hydrotherapy:**
- Confirm whether her thyroid condition is stable and whether she is unusually sensitive to heat or cold before selecting a modality.
- **Documentation:**
- Record both conditions, the pressure and positioning modification, the reason for it and the consent obtained.
- **Teaching point:**
- The medication list is a second, more reliable health history. Always read it and ask what each medication is for.

Case Application 2 — The Systemic Pattern in a Local Complaint

- **Presentation:**
- A 31-year-old man books for bilateral wrist and hand discomfort that he attributes to computer work. On screening he mentions that his rings no longer fit, his shoes have gone up a size in two years, and he has begun to snore heavily.
- Why this is not a repetitive strain presentation: The findings are bilateral and progressive, and involve growth of tissue rather than irritation of it. Enlargement of hands, feet and jaw with new sleep-disordered breathing is a recognized pattern of growth hormone excess (Katznelson et al., 2014).
- **Correct professional response:**
- Do not name a condition. Record the findings, advise medical assessment, and document that you did so.
- May you treat? Yes, symptomatically and moderately, with informed consent. There is no reason to withhold general treatment while he seeks assessment.
- **Modifications:**
- Avoid aggressive work at the carpal tunnel, screen for reduced sensation, and check blood pressure history, since hypertension and sleep apnea commonly accompany this pattern.
- **Follow up:**
- Ask at the next visit whether he attended and what was found, and adjust the plan accordingly.
- **Teaching point:**
- The value of endocrinology to an RMT is precisely this — recognizing when a local musculoskeletal story does not explain the findings.

Review Questions — Lecture 02

- 1. State the location of the pituitary gland and explain why its two lobes differ in tissue type and control mechanism.
- 2. Name the hormone of the pineal gland, its precursor amino acid and its principal function.
- 3. Describe the location of the thyroid gland and name its three hormones with their effects.
- 4. Explain why parathyroid hormone rather than calcitonin is described as the dominant regulator of blood calcium in adults.
- 5. Name the three zones of the adrenal cortex and the class of hormone each produces.
- 6. Distinguish the tissue type and control mechanism of the adrenal cortex from those of the adrenal medulla.
- 7. Name the two principal islet cell types, their hormones and their opposing effects on blood glucose.
- 8. List three hormones produced by the kidney or activated there and give the consequence of losing each.
- 9. Name four hormones that influence bone density and state whether each increases or decreases it.
- 10. Explain why untreated hypothyroidism produces symptoms in at least five different body systems.
- 11. A patient's list includes prednisone, alendronate and insulin. State one treatment modification prompted by each.
- 12. List five screening questions that should appear on every intake form for endocrine risk.
- 13. Explain what an RMT may and may not say to a patient who shows a clear pattern of endocrine disease.
- 14. State three cautions that apply to work on the anterior neck and the reason for each.

Session Summary

- The hypothalamus links the nervous and endocrine systems and governs the pituitary, which in turn governs the thyroid, adrenal cortex and gonads.
- The thyroid sets metabolic rate; the parathyroids are the dominant regulators of blood calcium; the thymus establishes immune self-tolerance, whose failure produces most autoimmune endocrine disease.
- The adrenal cortex secretes steroid hormones by zone; the adrenal medulla is functionally a sympathetic ganglion secreting catecholamines.
- The pancreatic islets defend the blood glucose set point through the antagonistic pair insulin and glucagon.
- Kidney, heart, skin, bone, gut and adipose tissue all have endocrine functions with direct clinical consequences.
- Endocrine disease presents systemically because one hormone acts on many tissues. Bilateral, symmetrical, multi-system findings are a referral signal.
- The medication list is a reliable second health history. Learning to read it changes pressure, positioning, duration, hydrotherapy and scheduling decisions.

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