Unit 4: Circulatory and Lymphatic Systems

Circulatory and Lymphatic Systems for Kalari Uzhichil

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1) Structure and function of the heart and blood vessels

Heart anatomy & pump cycle – The heart is a four-chambered pump: **atria** receive blood; **ventricles** eject it. Right heart sends deoxygenated blood to the lungs; left heart sends oxygenated blood to the body. During **systole** the ventricles contract and open the semilunar valves; during **diastole** the ventricles relax and refill. Stroke volume × heart rate = **cardiac output**, the chief determinant of systemic perfusion.

Vessel types & wall structure –

- **Arteries/arterioles** carry blood away from the heart under higher pressure; thick **tunica media** (smooth muscle) lets arterioles regulate regional flow.
- **Capillaries** are one-cell-thick exchange beds where oxygen, nutrients, and waste trade with tissues.
- **Veins/venules** return blood to the heart under low pressure; thin walls, larger lumens, and **one-way valves** prevent backflow—critical for lower-limb return against gravity.
- **Coronary, carotid/vertebral, renal, mesenteric** beds are priority circuits; manual therapy avoids prolonged strong pressure directly over carotids and delicate abdominal vasculature.

Relevance to massage – Because veins are low-pressure and valved, **stroke direction toward the heart** assists venous return. Arteriolar tone responds to local chemical signals and gentle shear stress, so warm, rhythmic glides can improve **microcirculation** without overstimulating the heart.

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2) Blood circulation and relevance to massage (venous return, blood flow)

Venous return mechanisms –

- **Muscle pump –** contracting muscles compress deep veins and push blood past valves.
- **Respiratory pump –** inhalation lowers thoracic pressure and draws venous blood upward.
- **Gravity & valves –** valves segment columns of blood; when they fail, **varicosities** form.

Massage applications –

- **Stroke vectors –** use **distal → proximal** glides along limbs to support venous return; pause at natural “gateways” (popliteal, femoral, axillary) without deep pressure on the vessel itself.
- **Pacing & depth –** slow, moderate depth glides create steady afferent input and mild vasodilation; overly deep, rapid friction in congested areas can provoke a rebound spasm or bruising.
- **Breath coupling –** press/release tempo synchronized to the client’s **exhale** enhances the respiratory pump and keeps the autonomic state calm.

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3) Lymphatic system and its role in immunity and detoxification

What lymph is – A clear fluid formed when interstitial fluid (with proteins, lipids, cellular debris) enters **initial lymphatics** in the skin/dermis. It travels through **precollectors → collectors** (with valves and smooth-muscle segments called **lymphangions**) to **lymph nodes**, then returns to blood via the **thoracic duct** (most of body) or **right lymphatic duct** (right head/neck, right upper limb, right upper chest).

Immune functions – Lymph nodes act as **filters and training hubs** for immune cells (B/T lymphocytes, macrophages). Nodes swell/tender when actively filtering. The spleen and tonsils are allied lymphoid organs; skin and gut also host large immune networks.

Manual relevance –

- **Fluid physics –** lymph flow is **slow, low-pressure** and easily assisted by **skin-level stretch** rather than deep compression.
- **Drainage territories –** head/neck drain to cervical nodes; upper limbs to axillary; lower abdomen and legs to inguinal → pelvic → thoracic duct.
- **"Clear then move" principle –** first **decongest proximal basins** (e.g., inguinal/axillary), then guide fluid from distal tissues toward the cleared basins.

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4) Effects of massage on cardiovascular and lymphatic systems

Cardiovascular effects –

- **Local circulation –** gentle shear and heat increase cutaneous and myofascial blood flow; muscles receive better oxygen and waste removal.
- **Autonomic balance –** slow, warm strokes increase parasympathetic tone, often **lowering heart rate and blood pressure** transiently.
- **Endothelial response –** rhythmic pressure supports nitric-oxide release, reducing vascular resistance modestly in healthy clients.

Lymphatic effects –

- **Enhanced lymph return –** light, directional skin stretch (manual lymph techniques) improves lymphangion activity and valve opening.
- **Edema reduction –** when not due to cardiac/renal failure or acute clot, swelling from sprain or immobility often decreases with properly sequenced lymph work.
- **Immune support –** by improving node turnover and interstitial clearance, clients often report reduced heaviness and faster recovery after training.

Performance & recovery – Better perfusion and lymph drainage translate to **less DOMS**, quicker removal of metabolites, and improved joint range—key for chuvadukal patterns and weapon drills.

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5) Contraindications related to circulatory issues (e.g., varicose veins)

Absolute (no massage on/around the area; urgent referral if suspected) –

- **Deep vein thrombosis (DVT)/pulmonary embolism risk –** calf pain, heat, redness, swelling, pitting edema.
- **Acute cellulitis or systemic infection –** fever, red streaks toward nodes.
- **Unstable cardiac conditions –** uncontrolled heart failure, recent myocardial infarction (until medically cleared).
- **Uncontrolled severe hypertension –** defer until stabilized.
- **Active bleeding disorders or anticoagulation with bruising –** avoid deep pressure; coordinate with physician.

Relative (modify technique; stay light, short, or avoid local area) –

- **Varicose veins –** avoid deep or cross-fiber pressure directly over the vein; use gentle **distal → proximal** glides in surrounding tissue, elevate limb, and finish proximal.
- **Atherosclerotic carotids – no deep work** over anterior neck; prefer feather-light strokes posteriorly.
- **New surgical sites or radiation changes –** respect scar maturation; use very light lymph techniques if cleared.
- **Pregnancy –** avoid sustained deep pressure behind the knee/groin; favour light lymph strokes and left-side lying in

late trimesters.
- **Lymphedema** (diagnosed) – **only** with appropriate training; follow medical guidance, use **very light** MLD, compression, and exercise sequence.

Practical technique notes for Kalari Uzhichil

Oil temperature & pace – warm oils (≈38–40 °C) soften arteriolar tone and skin viscosity; pair with **slow, continuous** glides for parasympathetic shift when aiming to calm. For Kapha-type heaviness, slightly faster, lighter strokes support venous/lymph return without overheating.

Node "gates" – when guiding lymph, **prepare proximal gates first** (e.g., gentle circular skin stretch over inguinal or axillary nodes for 30–60 s), then move fluid from calf/forearm toward those gates.

Finish positions – a brief **legs-elevated** rest or a few slow diaphragmatic breaths after chest work enhances both venous and lymphatic return via the respiratory pump.

Summary Tables

A) Heart & Vessels — Quick Facts

Component	Function	Therapist Cues
Heart (systole/diastole)	Ejects → refills	Keep client breathing; avoid breath-holds during deep work
Arteries/arterioles	Delivery & resistance control	Avoid prolonged hard pressure on pulsatile arteries
Capillaries	Exchange	Gentle heat improves local perfusion
Veins (valved)	Return to heart	Stroke **distal → proximal**, use limb elevation when appropriate

B) Massage & Circulation — What Helps

Goal	Mechanism	Technique Highlight
Venous return	Muscle/respiratory pump + valves	Long, unbroken glides toward the heart, synced to exhale
Microcirculation	Endothelial NO, heat	Warm oil, steady forearm glide; avoid abrupt friction
Calm BP/HR	Parasympathetic rise	Palm holds over sternum/abdomen; slow cadence

C) Lymphatic Basics & Sequencing

Element	Key Point	Practical Step
Initial lymphatics	Open with skin stretch, not pressure	Very light circular stretch of skin (no sliding)
Collectors/lymphangions	Rhythm improves with gentle load	Short sets of proximal "clearing" before distal work
Nodes	Filter pathogens/debris	Never dig into a tender node; use light, brief stimulation
Drainage route	To venous angles at neck	End sequences with a few gentle strokes at supraclavicular region (if appropriate)

D) Effects & Dosage

System	Expected Effect	Dosage Guide
Cardiovascular	Warmer skin, eased pulse	10–20 min of slow, warm glides for systemic calming
Lymphatic	Reduced limb heaviness, less swelling	5–10 min proximal clearing + 10–15 min distal-to-proximal guidance
Recovery	Less post-training soreness	Add brief steam or gentle movement after session

E) Circulatory Contraindications & Modifications

Condition	Action	Safer Alternative
Suspected DVT	**Stop & refer**	None—medical emergency
Uncontrolled hypertension	Defer; monitor BP	Short, light session focusing on breath once cleared
Varicose veins	Avoid deep local pressure	Gentle surrounding glides; limb elevation
Cardiac failure (decompensated)	Defer; physician care	Very brief, seated calming work only if cleared
Acute infection/cellulitis	**No massage**	Resume after full medical resolution

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Key take-aways

1. **Stroke direction and pace matter**—work **distal → proximal** at a calm tempo to aid venous and lymph return.
2. **Lymph needs light**—clear proximal territories first, then guide distal fluid; think **"clear, then move."**
3. **Autonomic tone is the master dial**—slow, warm contact supports parasympathetic recovery; brisker, lighter strokes mobilize heaviness.
4. **Safety first**—know the red flags (DVT, unstable cardiac states, infection) and modify or defer when circulatory risk is present.

Use these principles to make every Kalari Uzhichil session a precise, safe collaboration with the body's own **blood and lymph pumps**, amplifying recovery, immunity, and calm.