

The Haematological Examination

From Practice to Evidence

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Part 1 — The examination

Setting up. There is no haematological system to examine in the way there is a chest or a heart; there is a whole body in which blood disease leaves marks, and the examination is a search through it for five things — the signs of **anaemia**, of **bleeding**, of **infection and immune failure**, of **infiltration** (nodes, spleen, liver, bone, skin, gums) and of **thrombosis** — followed by the systems a particular blood disease damages: the nervous system in cobalamin deficiency, the heart in iron overload, the lungs and the brain in sickle cell disease. The examination begins with the history's bleeding score and the patient's ethnic and family background, because in this region the haemoglobinopathies are common enough that a splenectomy scar, a leg ulcer or a facies has a likely diagnosis before a hand is laid on. Good daylight matters more here than anywhere else in the examination: pallor, jaundice and petechiae are all colour judgements, and the colour changes under a fluorescent tube.

The general survey

- **Pallor.** Examined at four sites, each recorded: the anterior rim of the lower palpebral conjunctiva, compared with the deeper fornix; the palmar creases with the hand extended, which stay pink until the haemoglobin is well below 7 g/dL; the tongue; and the nail beds. Pallor of the rim of the conjunctiva is the most useful single site, and pallor of the tongue the most reproducible between examiners. The face is the least useful.
- **Jaundice.** In the sclera, in daylight, with the patient looking down and the lid raised; visible from a bilirubin of roughly 3 mg/dL, and missed by a third of examiners at that level. The combination of pallor and mild jaundice is haemolysis until proved otherwise.
- **Plethora and cyanosis.** The ruddy face and conjunctival injection of polycythaemia; the dusky acral cyanosis of a cold agglutinin, worse in a cold room; the livedo of the antiphospholipid syndrome and of cryoglobulinaemia.
- **The skin.** Bruising, recorded by site, size, age and whether it fits the story; petechiae — pinpoint, non-blanching, in dependent areas and where the skin is squeezed — which point to platelets or the vessel wall; purpura and ecchymoses, which point to platelets or coagulation; the telangiectasia of hereditary haemorrhagic telangiectasia on the lips and fingertips; excoriations from the pruritus of polycythaemia and lymphoma; the hyperpigmentation of transfusional iron; leg ulcers over the malleoli in sickle cell disease and the other haemolytic anaemias; the infiltrative plaques and nodules of leukaemia cutis and cutaneous lymphoma; and the rash of a drug reaction, which is the commonest cause of a new cytopenia on the ward.

- **The nails.** Koilonychia in long-standing iron deficiency; splinter haemorrhages; the pale nail bed.
- **The mouth.** The smooth, red, sore tongue of iron, folate or cobalamin deficiency; angular stomatitis; the gum hypertrophy of monocytic leukaemia; bleeding gums and the blood blisters of 'wet purpura' on the buccal mucosa, which mark a platelet count low enough to matter; candida and the ulcers of neutropenia; the tonsils of infectious mononucleosis; and dental sepsis, which is the source that matters before chemotherapy.
- **The eyes.** Conjunctival pallor and icterus as above; the fundi for retinal haemorrhages in thrombocytopenia and leukaemia, Roth spots, the dilated, tortuous, sausage-shaped veins of hyperviscosity in myeloma and Waldenström macroglobulinaemia, and the proliferative retinopathy of sickle cell disease.

The lymph nodes

Each group is examined in turn with the pads of the fingers, the examiner standing behind for the neck and in front for the axillae and groins: the pre- and post-auricular, occipital, submental, submandibular, anterior and posterior cervical chains, supraclavicular fossae, the axillae with the arm supported, the epitrochlear nodes with the elbow flexed, and the inguinal and femoral nodes. For each node found: **site, size in centimetres, consistency, tenderness, mobility and whether it is matted to its neighbours or fixed to skin or deep tissue.** A rubbery, painless, mobile node is the texture of lymphoma; a hard, fixed, craggy node is carcinoma; a tender, soft node with overlying warmth is infection. A supraclavicular node in an adult is malignant until proved otherwise. Localised lymphadenopathy sends the examiner to the region it drains — the scalp, the mouth and pharynx, the breast, the hand, the leg and the perineum; generalised lymphadenopathy sends the examiner to the spleen, the liver and the blood film. Waldeyer's ring is inspected in every patient with cervical nodes.

The spleen and the liver

The spleen enlarges towards the right iliac fossa, and the examination starts there so that a large spleen is not missed by a hand placed over it. The patient lies flat with the arms at the sides; the examiner's right hand starts in the right iliac fossa and moves towards the left costal margin a few centimetres at a time, feeling for the edge to meet the fingertips on each inspiration, the left hand supporting the lower ribs from behind. If nothing is felt, the patient is rolled onto the right side with the left leg flexed, and the examination repeated. The spleen is distinguished from the left kidney by five things: it has a notch, the examiner cannot get above it, it moves down with inspiration, it is dull to percussion, and it enlarges towards the umbilicus rather than downwards. Percussion is done before palpation in the patient in whom the spleen is not obviously enlarged: over Traube's space (the lowest intercostal space in the anterior axillary line, tympanic when the spleen is normal), Castell's sign (dullness in the lowest intercostal space in the anterior axillary line on full inspiration), and Nixon's method (percussion downwards along the mid-axillary line in the right lateral position, the upper border of dullness more than 8 cm above the costal margin being positive). A palpable spleen is measured in centimetres below the costal margin along its long axis. The liver is examined

as the gastrointestinal chapter described, with its span by percussion and the character of its edge, and the abdomen for ascites and for the collateral veins of portal hypertension, which decide whether a large spleen is haematological or hepatic.

Bone, joints and the vessels

- **Bone.** Sternal tenderness to firm pressure in leukaemia and myeloma; vertebral tenderness on percussion, and the kyphosis of vertebral collapse, in myeloma; bone pain and swelling in sickle cell crisis; the frontal bossing and maxillary overgrowth of poorly transfused thalassaemia.
- **Joints.** Haemarthrosis and the chronic arthropathy of haemophilia, particularly the knees, elbows and ankles, with muscle wasting above them; the swollen, tender hands and feet of dactylitis in a sickle-cell infant; gout in the myeloproliferative disorders.
- **Thrombosis.** For a deep vein thrombosis: unilateral calf or thigh swelling measured 10 cm below the tibial tuberosity and compared, tenderness along the deep veins, pitting oedema confined to one leg, dilated superficial collateral veins, and the risk factors that make up the Wells score; Homans's sign is not elicited. Superficial thrombophlebitis as a cord. The upper limb and the neck for a catheter-associated thrombosis and for superior vena cava obstruction — facial plethora, distended non-pulsatile neck veins, collateral veins over the chest — in a patient with a mediastinal lymphoma.

The systems that blood disease damages

- **The nervous system.** In cobalamin deficiency, the dorsal columns (vibration and position sense in the feet, a positive Romberg, a stamping gait) with a peripheral neuropathy and, paradoxically, brisk knee jerks with absent ankle jerks and extensor plantars; cognition and mood. In the hyperviscosity syndromes, headache, visual blurring and a fluctuating level of consciousness with the fundus above. In acute leukaemia and lymphoma, cranial nerve palsies from meningeal infiltration. In myeloma, the sensory level and the weak legs of cord compression, which is an emergency the examination finds before the scan. In sickle cell disease, the hemiparesis of stroke in a child.
- **The heart.** The tachycardia, wide pulse pressure, collapsing pulse and flow murmur of severe anaemia; the signs of heart failure and the arrhythmias of transfusional iron overload; the loud pulmonary second sound and right ventricular heave of pulmonary hypertension in sickle cell disease and thalassaemia.
- **The lungs.** Consolidation in the acute chest syndrome, which is found by examination and confirmed by the radiograph; the neutropenic patient's chest, where the signs are muted because there are no neutrophils to make them.
- **The abdomen and pelvis.** The splenectomy scar, the enlarged, tender liver of sequestration, the priapism of sickle cell disease, and the pelvic examination that finds the source of an iron deficiency in a woman.

Completing the examination

Temperature and its chart, because fever in a neutropenic patient is the finding that changes management within the hour; weight, and weight loss; the urine for haemoglobinuria and for the dark urine of haemolysis; and the bleeding history scored formally with the ISTH bleeding assessment tool, which is a history rather than an examination but is the instrument against which every bleeding sign is judged. Then the extension of the examination that no bedside sign replaces: the full blood count and the peripheral blood film, examined by the clinician who examined the patient.

Putting the signs together

The haematological examination sorts patients by which of the five things it found and in what combination, and the combination narrows the film before it is seen.

Pattern	The signs that make it
Iron deficiency	Pallor with a pale tongue, koilonychia, angular stomatitis and atrophic glossitis; no jaundice; no nodes or spleen; a source found on rectal, pelvic or abdominal examination.
Megaloblastic anaemia	Pallor with a lemon tint of mild jaundice; a smooth, beefy tongue; grey hair early; and in cobalamin deficiency the dorsal-column and peripheral-nerve signs, with brisk knees and absent ankles.
Haemolysis	Pallor with jaundice and a palpable spleen; dark urine; leg ulcers and the facies of a chronic congenital haemolytic anaemia; a splenectomy scar in an adult.
Acute leukaemia	Pallor, petechiae and bruising, fever and mouth sepsis together; gum hypertrophy in the monocytic subtypes; sternal tenderness; modest lymphadenopathy and splenomegaly; leukaemia cutis; a cranial nerve palsy.
Chronic myeloid leukaemia and myelofibrosis	A massive spleen reaching the umbilicus or beyond, often with a tender edge from infarction, in a patient who is otherwise well or pale; the liver enlarged; bone pain.
Lymphoma	Painless, rubbery, mobile nodes in one or several regions; Waldeyer's ring; the spleen; the signs of superior vena cava obstruction; excoriations from pruritus; the fever and sweats in the history.
Myeloma	Pallor; bone tenderness over the sternum and spine and a kyphosis; the fundus of hyperviscosity; the sensory level of cord compression; carpal tunnel syndrome and macroglossia in amyloid.
Thrombocytopenia	Petechiae in dependent areas and under the cuff, purpura, wet purpura in the mouth, retinal haemorrhages — with a normal spleen and no nodes in immune thrombocytopenia, and with a spleen and nodes when it is secondary.
Inherited coagulation and von Willebrand disease	Ecchymoses, haemarthroses and the chronic arthropathy of the haemophilias; mucosal bleeding — epistaxis, gum bleeding, menorrhagia — in von Willebrand disease and the platelet disorders; a high bleeding score.
Polycythaemia vera	Plethora, conjunctival injection, excoriations, a palpable spleen, hypertension, the engorged retinal veins, and gout.
Sickle cell disease	Pallor and jaundice; a spleen that is palpable in the child and absent by adolescence; leg ulcers; dactylitis in infancy; the signs of stroke, pulmonary hypertension, acute chest syndrome, priapism and proliferative retinopathy in

Pattern	The signs that make it
	the complications.
Thrombosis and the antiphospholipid syndrome	A swollen leg with the Wells findings; livedo reticularis; the history of pregnancy loss; a cardiac murmur from valve thickening.

Part 2 — What the literature says

How well do examiners agree?

The signs of haematological disease are mostly colour judgements and palpation of organs that are usually not palpable, and both are hard to reproduce. When two observers graded pallor independently in 390 hospital patients, agreement on conjunctival pallor was no better than chance (κ 0.07) and on tongue pallor only slightly better (κ 0.20), although the tongue was also the site that best discriminated anaemia at haemoglobin thresholds of 7 and 9 g/dL [1]. Eight examiners applying three methods of palpation and three of percussion to the same 27 patients with ultrasonographically defined splenomegaly produced specificities that ranged from 50 to 100 per cent for palpation and 60 to 100 per cent for percussion depending on who examined — the sign belonged to the examiner, not the patient [2]. At a bilirubin of 2.5 mg/dL, the level at which scleral icterus is said to appear, only 58 per cent of examiners detected it, and at 3.1 mg/dL 68 per cent [3].

Sign	Agreement	Comment
Conjunctival pallor	κ 0.07	Two observers, 390 patients; no better than chance [1]
Tongue pallor	κ 0.20	The most reproducible site, and the best discriminator [1]
Splenomegaly by palpation or percussion	examiner-dependent	Specificity 50 – 100 per cent across eight examiners for palpation; 60 – 100 per cent for percussion [2]
Scleral icterus	58 – 68 per cent of examiners	At bilirubin 2.5 and 3.1 mg/dL; a third of examiners miss it at the textbook threshold [3]
Liver edge and span	poor	Documented observer variation for both clinical and radiological hepatosplenomegaly; see the gastrointestinal chapter [4]
Lymph node palpation	not formally measured	No interobserver study of bedside node palpation was found; the imaging literature shows that morphological judgements (consistency, matting) reproduce worse than measured size
Bleeding score (ISTH-BAT)	good	The self-administered version agrees with the expert-administered one and is feasible [5]

The lesson repeats the pattern of the earlier chapters: the count and the measurement — a node in centimetres, a spleen in centimetres below the margin, a bleeding score — are reproducible, and the impression — pale, icteric, palpable — is not, unless the examiners have agreed a site and a threshold. In this examination the agreed site matters more than usual: the rim of the conjunctiva

rather than the whole of it, the tongue rather than the face, the right iliac fossa rather than the left upper quadrant.

How accurate are the signs? The Rational Clinical Examination series and after

Question	Finding	Likelihood ratio or accuracy	Source
Is this patient anaemic?	Pallor of the conjunctival rim · conjunctival pallor · palmar pallor · palmar crease pallor	LR+ 16.7 · 4.7 · 5.6 · 7.9 for haemoglobin below 11 g/dL; palmar crease pallor specificity 1.00	Compilation in J Gen Intern Med 2021 [6]; Nardone 1990 [7]
	Conjunctival pallor present · borderline · absent	LR 4.5 · 1.8 · 0.6 for haemoglobin $\leq$ 9 g/dL — the absence of pallor does not exclude anaemia	Sheth 1997 [8]
	Pallor at any of conjunctiva, face or palms	Sensitivity 65 per cent at a haematocrit of 0.30; single-site LRs 2.3 – 2.5	Nardone 1990 [7]
Does this patient have splenomegaly?	Palpable spleen	LR+ 8.5, LR– 0.5 — specific, not sensitive; examine only when the pre-test probability is above about 10 per cent	Grover 1993 [9]
	Castell's sign · Traube's space percussion	Sensitivity 82, specificity 83 per cent · sensitivity 62, specificity 72 per cent	
	Nixon's method · Traube's space, in a 2026 inpatient cohort	Specificity 90.8 per cent · sensitivity 52.7 per cent — the most specific and the most sensitive manoeuvres respectively	Ultrasound Quarterly 2026 [10]
Is the liver enlarged?	Palpable liver edge	Does not equal hepatomegaly; the span by percussion is the useful measurement	Naylor 1994 [11]
Is this lymph node malignant?	Any unexplained peripheral node in primary care	Prevalence of malignancy 1.1 per cent; 11 per cent after referral; 54 – 85 per cent for supraclavicular nodes in biopsy series	Fijten & Blankenstein 1988 [12]; reviews [13, 14]
	Size, age, male sex, firm consistency, supraclavicular or cervical site	Independent predictors in a quick-diagnosis-unit cohort; each 5 mm of size raised the odds of malignancy by 36 per cent; optimal cut-off 25.5 mm (AUC 0.76); no malignancy in nodes present for more than 12 months	Multivariable analysis 2026 [15]
Does this patient have a deep vein thrombosis?	Individual signs — swelling, tenderness, Homans's sign,	Sensitivity 60 – 96 per cent, specificity 20 – 72 per cent;	Anand 1998 [16]

Question	Finding	Likelihood ratio or accuracy	Source
	erythema	no single sign reliable	
	The Wells combination of risk factors, symptoms and signs	Stratifies to low, moderate and high pre-test probability; with a negative D-dimer it excludes the diagnosis	
Does this patient have a bleeding disorder?	ISTH bleeding assessment tool	Pooled sensitivity 82 per cent, specificity 66 per cent across 31 studies; 77 and 70 per cent for the ISTH-BAT itself; more sensitive in men, more specific in women at the same threshold	Meta-analyses 2018 and 2022 [17, 18]
Is the platelet count low enough to bleed?	Petechiae, purpura, ecchymoses	Usually absent above $50 \times 10^9/L$; skin signs between 20 and 50; a high risk of serious bleeding below 10	Review 2022 [19]
Is this patient jaundiced?	Scleral icterus	Visible from about 3 mg/dL; a third of examiners miss it at 2.5 mg/dL	Multiple-examiner study 1997 [3]

Three things stand out. **The examination for anaemia rules in and does not rule out:** a pale conjunctival rim or a pale palmar crease is close to diagnostic, and a normal colour proves little — which is why the haemoglobin is measured in anyone in whom the question was worth asking. **The spleen is a specific sign in an unselected patient and a useful one only in a selected one**, because at a low pre-test probability most palpable spleens are not enlarged and most enlarged spleens are not palpable. And **the two diagnoses where the examination has been formally shown to be insufficient — the deep vein thrombosis and the bleeding disorder — have both been replaced at the bedside by a structured score**, the Wells score and the bleeding assessment tool, which are what the examination now feeds.

The examiner is the limiting reagent

The pallor and spleen data above are the clearest demonstrations in this whole series that a sign can belong to the examiner rather than to the patient: a kappa of 0.07 means that two doctors looking at the same conjunctiva were, in effect, tossing a coin, and eight examiners produced eight different specificities for the same spleens [1, 2]. The remedy the evidence supports is not more practice at the same technique but a different technique: the tongue rather than the conjunctiva, the conjunctival rim rather than the whole conjunctiva, percussion before palpation, the right iliac fossa as the starting point — and, increasingly, a probe. Internal medicine residents measuring the spleen with a hand-carried ultrasound device after minimal training produced lengths that correlated closely with formal imaging [20], which is a shorter route to reliability than years of palpation.

Technique changes the answer

- **Choose the site for pallor.** The anterior rim of the lower conjunctiva compared with the fornix, and the tongue; record both. The face is not a site [1, 6, 7].
- **Look in daylight** for pallor, jaundice and petechiae; the icterus threshold quoted in textbooks assumes it [3].
- **Start the spleen in the right iliac fossa**, percuss before palpating, and roll the patient onto the right side before declaring the spleen impalpable [9, 10].
- **Measure, do not describe:** the node in centimetres, the spleen in centimetres below the costal margin, the calf circumference 10 cm below the tibial tuberosity, the bleeding history as a score [15, 16, 17].
- **Use the Wells score before the D-dimer, and the bleeding assessment tool before the coagulation screen**, because each is the validated form of the examination and the history it summarises [16, 17].
- **Squeeze the skin and look under the cuff** for petechiae; the sign appears where pressure is applied and in dependent areas first [19].

What has changed, 2020 – 2026

The spleen is measured at the bedside. Point-of-care ultrasound in hospitalised patients found splenomegaly in 33 per cent by length and 52 per cent by volume where palpation found it in 25 per cent [21]. A prospective study of internal medicine and haematology inpatients enrolled between 2023 and 2024 and published in 2026 applied Castell's, Traube's and Nixon's methods and one-handed palpation to every patient before a point-of-care scan: ultrasound reached a sensitivity of 70.9 per cent and specificity of 72.0 per cent against formal imaging, better than any manoeuvre, at the cost of taking almost twice as long (a median of 142 against 82 seconds for all four manoeuvres together) and of losing accuracy in patients with a high body-mass index or within two hours of a meal [10]. Sonographic versions of the same percussion and palpation techniques have been compared directly with the hands [22].

The veins are compressed with a probe, not a hand. Two-point compression ultrasound of the common femoral and popliteal veins by emergency physicians has a pooled sensitivity of 0.91 and specificity of 0.98, no different from the three-point technique, with a false-negative rate of about 4 per cent that falls when the operator is an attending rather than a resident; its blind spot is the isolated femoral vein thrombosis between the two points [23, 24]. The bedside examination for deep vein thrombosis has become the Wells score plus the probe.

Anaemia is being read from a photograph. A smartphone application that estimates haemoglobin from the colour of the fingernail beds, validated in 100 patients against the full blood count, detected anaemia with a sensitivity of 97 per cent and an accuracy of ± 2.4 g/dL, improving to ± 0.9 g/dL with personal calibration [25]; the palpebral conjunctival erythema index from a compact camera had a sensitivity of 93 per cent in derivation and 57 per cent in validation, with specificities of 78 and 83 per cent [26]; and 2024–2025 systems using vision transformers and real-time

conjunctival capture report accuracies in the mid-nineties on internal test sets, with external validation still thin and skin tone a recognised source of error [27, 28, 29]. The clinical signs that the machine measures — the colour of the nail bed and of the conjunctiva — are the same ones the examiner cannot agree on; what the camera adds is a fixed threshold.

The bleeding history has been standardised and validated. The ISTH bleeding assessment tool, self-administered or clinician-administered, has been tested in 31 studies and pools to a sensitivity of 82 per cent and a specificity of 66 per cent for an inherited bleeding disorder, with the 2021 ASH/ISTH von Willebrand guidelines building it into the diagnostic pathway [5, 17, 18]. **Lymphadenopathy has acquired a multivariable model:** a 2026 quick-diagnosis-unit analysis modelled node size and age continuously and found risk rising by a third for every 5 mm, with no malignancy among nodes present for more than a year [15].

Part 3 — Practical synthesis for teaching

- Teach the examination as a search for five things — anaemia, bleeding, infection, infiltration, thrombosis — and the systems the disease damages, rather than as a list of signs; the combination is the diagnosis.
- Teach the sites and the thresholds: the conjunctival rim and the tongue for pallor, the sclera in daylight for jaundice, the right iliac fossa and percussion first for the spleen. The reliability studies say the technique, not the examiner's experience, decides the kappa.
- Teach measurement: nodes and spleens in centimetres, calves in centimetres, bleeding as a score. A described node is an opinion; a measured node is a finding a colleague can act on.
- Teach the structured scores as the examination's validated form: the Wells score before the D-dimer, the bleeding assessment tool before the coagulation screen.
- Put the probe in the student's hand for the spleen and the popliteal vein, and put the film under the student's eye; both are the end of the haematological examination, not its rival.
- Be honest that a pale conjunctiva agreed on by two doctors is nearly a diagnosis and a pale conjunctiva seen by one is a coin toss, that most enlarged spleens are not palpable, and that the meningeal signs of the neurological chapter have their haematological equivalent in Homans's sign — taught for a century and shown to mean nothing.

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Caveats

The likelihood ratios for the individual pallor sites (16.7, 4.7, 5.6 and 7.9) are quoted from a 2021 compilation and from Nardone's 1990 series rather than from a single pooled analysis, and they were derived at different haemoglobin thresholds; they are ranked here, not compared. The 2026 splenomegaly study is cited from its abstract. Castell's and Traube's figures are those reported in the 1993 review as quoted in secondary sources. No interobserver study of bedside lymph node palpation was found, and the table says so rather than borrowing an imaging figure. Reference 30 supports the place of the bleeding score in the diagnostic pathway and is cited in the text by its findings. Where a reference is given by title and address only, the search results did not return an author list; check before distribution.