PT and aPTT patterns

Screening patterns, specimen checks, and mixing studies

Prothrombin time (PT) and **activated partial thromboplastin time (aPTT)** measure clotting after different reagents activate citrated plasma. The factors shared by the two tests explain why either one or both times can be prolonged.

Assay schematic: Roman numerals identify factors; V and VIII are cofactors. Thrombin cleaves fibrinogen to fibrin. Contact activation also needs prekallikrein and high-molecular-weight kininogen.

Patterns and possible explanations

Screening pattern	Possibilities to investigate	Interpretive limit
PT prolonged aPTT in range	VII deficiency/inhibitor; early vitamin K deficiency or warfarin.	Also possible with liver disease or direct factor Xa inhibitors.
aPTT prolonged PT in range	VIII, IX, XI, or contact-factor deficiency/inhibitor; heparin; lupus anticoagulant.	Contact-factor deficiency usually causes no bleeding. Lupus anticoagulant can accompany thrombosis.
Both prolonged	Common/multiple-factor deficiency: vitamin K deficiency, liver disease, or disseminated intravascular coagulation; anticoagulants.	Compare with platelets, fibrinogen, medications, and targeted tests.

Specimen and method checks

An underfilled tube leaves excess citrate for the plasma volume and may prolong times. Hematocrit above 55% also reduces plasma volume; adjust citrate under the procedure. Check for clots, heparin from a line draw, delays, and optical interference.

Anticoagulant effects depend on drug, concentration, and method. Normal times cannot exclude a direct oral anticoagulant.

What a mixing study shows

Equal volumes of patient and normal plasma supply missing factors. If the time corrects by the method's criteria, deficiency is more likely. Failure to correct suggests an inhibitor or drug. Some inhibitors become apparent only after incubation.

Mixing also dilutes inhibitors, so a weak inhibitor may be missed. Anticoagulant drugs can mimic an inhibitor pattern.

> Normal screening times do not exclude every bleeding disorder. They can occur in von Willebrand disease, platelet dysfunction, mild factor deficiencies, and factor XIII deficiency.