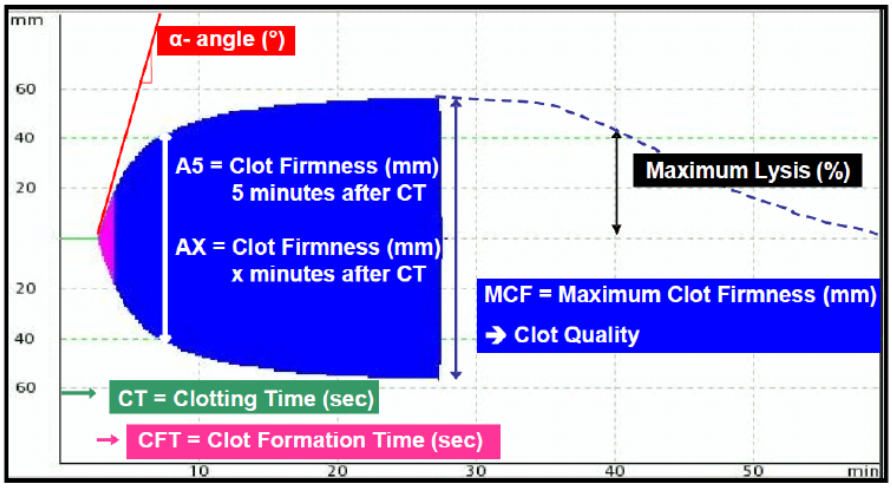
APPENDIX E: ROTEM MANUFACTURER'S GUIDELINES

ROTEM® parameters



CT (clotting time): time from start of measurement until initiation of clotting
=> initiation of clotting, thrombin formation, start of clot polymerisation

CFT (clot formation time): time from initiation of clotting until a clot firmness of 20mm is detected
=> fibrin polymerisation, stabilisation of the clot with thrombocytes and F XIII

MCF (maximum clot firmness): firmness of the clot
=> increasing stabilisation of the clot by the polymerised fibrin, thrombocytes as well as F XIII

ML (maximum lysis): reduction of the clot firmness after MCF in relation to MCF
=> stability of the clot (ML < 15%) or fibrinolysis (ML > 15% within 1h)

ROTEM® Reference values

test name (reagent)	CT (s)	CFT (s)	α Angle	A10(mm)	A15(mm)	A20(mm)	A25(mm)	MCF(mm)	CLI 30(%)	ML (%)[2]
INTEM	100-240	30-110	70-83	44-66	48-69	50-71	50-72	50-72	94-100	< 15
HEPTEM	*Comparison with INTEM. A better clot quality in HEPTEM as compared to INTEM indicates the presence of heparin or heparin-like anticoagulants in the sample.*									
EXTEM	38-79	34-159	63-83	43-65	48-69	50-71	50-72	50-72	94-100	< 15
APTEM	*Comparison with EXTEM. A better clot formation with ap-TEM® or APTEG-S when compared to ex-TEM® is an early sign of hyperfibrinolysis.*									
FIBTEM	n.d	n.d	n.d	7-23	n.d	8-24	n.d	9-25	n.d	n.d
	MCF <9 mm is a sign of decreased fibrinogen or disturbed clot polymerisation. MCF > 25 mm is a sign of elevated fibrinogen levels (which may lead to a normal EXTEM or INTEM in spite of thrombocytopenia).									
NATEM	300-1000 a)	150-700 a)	30-70 a)			35-60 a)		40-65 a)	94-100 a)	< 15 a)

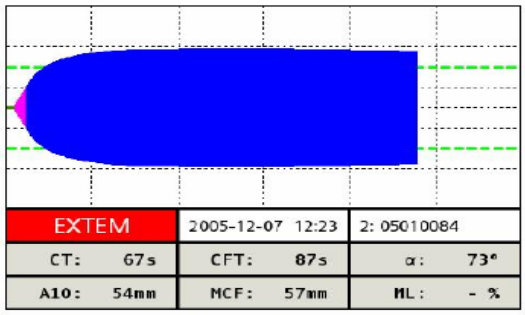
Reference: Lang, T Bauters A, Braun SL, Poetzch B, von Pape K-W, Kolde H-J, Lakner M. Multicenter investigation on reference ranges for ROTEM thromboelastometry (eingereicht in Blood Coagulation and fibrinolysis.

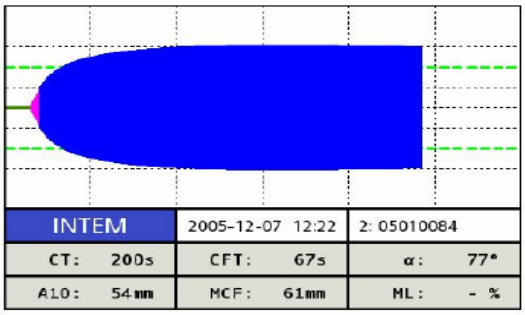
Test specificities: EXTEM & INTEM

EXTEM:
- extrinsic screening test
- CT not sensitive for heparin (up to 4 U/ml UFH in blood)

INTEM:
- intrinsic screening test
- CT sensitive for heparin (UFH)
- CT prolongation from > 0,15 U/ml UFH in blood

EXTEM & INTEM amplitude and CFT influenced by:
- fibrinogen
- platelets





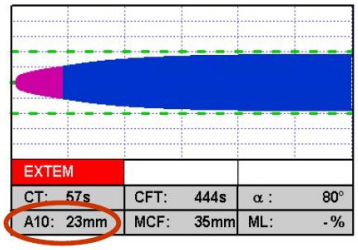
Test specificities: FIBTEM

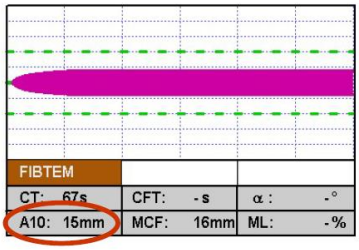
FIBTEM:
- activation as in EXTEM
- platelet inhibition reagent added

⇨ TEMogram shows isolated fibrinogen contribution to Clot firmness

A)
- EXTEM: amplitude low
- FIBTEM: amplitude normal

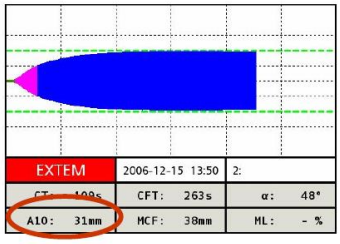
=> fibrinogen level OK
=> platelet deficiency

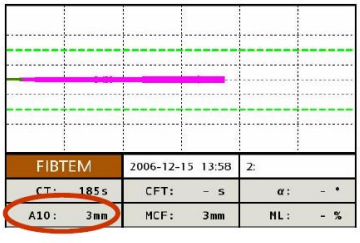




B)
- EXTEM: amplitude low
- FIBTEM: amplitude low

=> fibrinogen deficiency





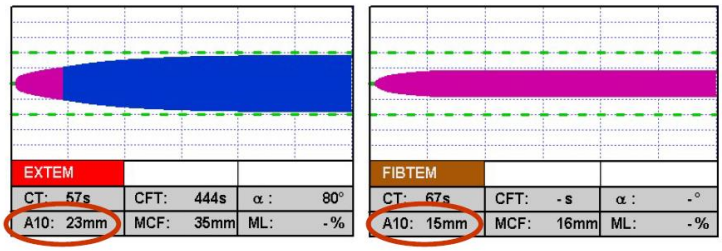
Test specificities: FIBTEM

FIBTEM:
- activation as in EXTEM
- platelet inhibition reagent added

→ TEMogram shows isolated fibrinogen contribution to Clot firmness

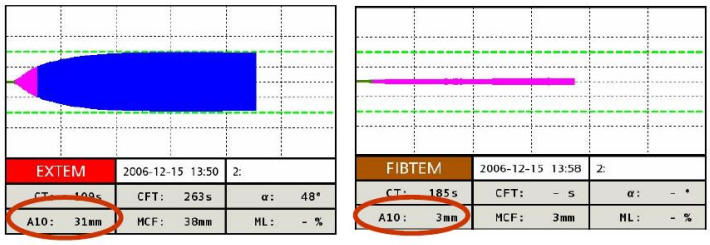
A)
- EXTEM: amplitude low
- FIBTEM: amplitude normal

=> fibrinogen level OK
=> platelet deficiency



B)
- EXTEM: amplitude low
- FIBTEM: amplitude low

=> fibrinogen deficiency



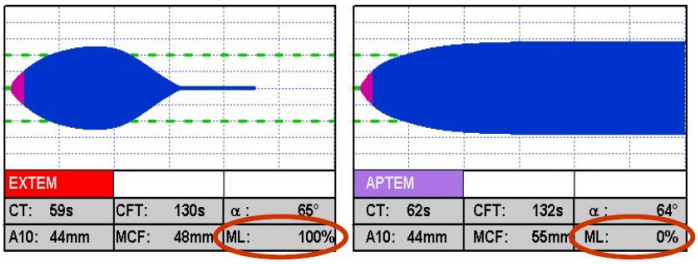
Test specificities: APTEM

APTEM:
- activation as in EXTEM
- fibrinolysis inhibition with aprotinin

→ TEMogram identifies hyperfibrinolysis

A)
- EXTEM: clear hyperfibrinolysis (ML 100%)
- APTEM: fibrinolysis inhibited (ML <15%)

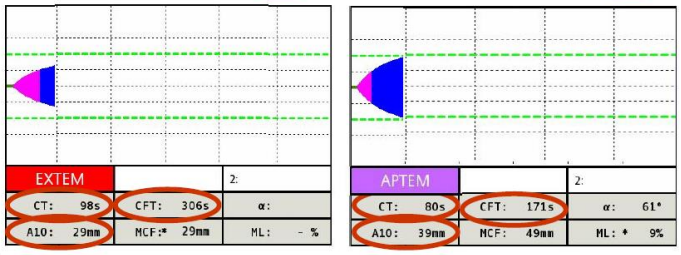
=> Fulminant hyper-fibrinolysis



B)
- APTEM:

CT > 10% shorter &
CFT > 20% shorter &
A10 higher than EXTEM
(or 2 out of 3)

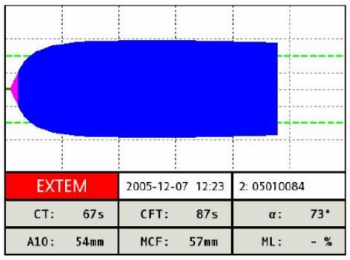
=> Consider mild hyper-fibrinolysis which will become visible later during measurement

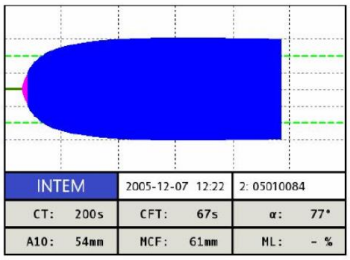


Normal haemostasis with different tests

EXTEM & INTEM

- Normal CT
- Normal amplitudes
- No hyperfibrinolysis visible



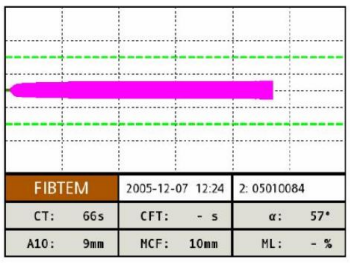


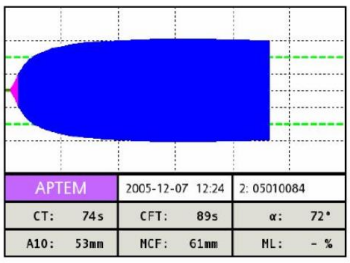
FIBTEM: Amplitude normal

=> fibrinogen level sufficient

&

EXTEM: Amplitude normal





=> platelets normal

APTEM ≈ EXTEM

=> No hyperfibrinolysis