Rotational Thromboelastometry (ROTEM)

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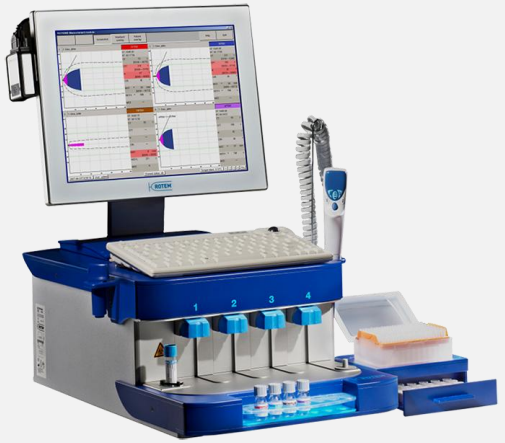
VISCOELASTIC HEMOSTATIC ASSAYS (VHA)

Problem with conventional coagulation tests

TEG 5000 (1948)

VHA measure the entire spectrum of clot formation

undergone a resurgence in popularity



ROTEM delta (1990)

1

How does ROTEM Work?

2

ROTEM Results

3

Interpretation of Results

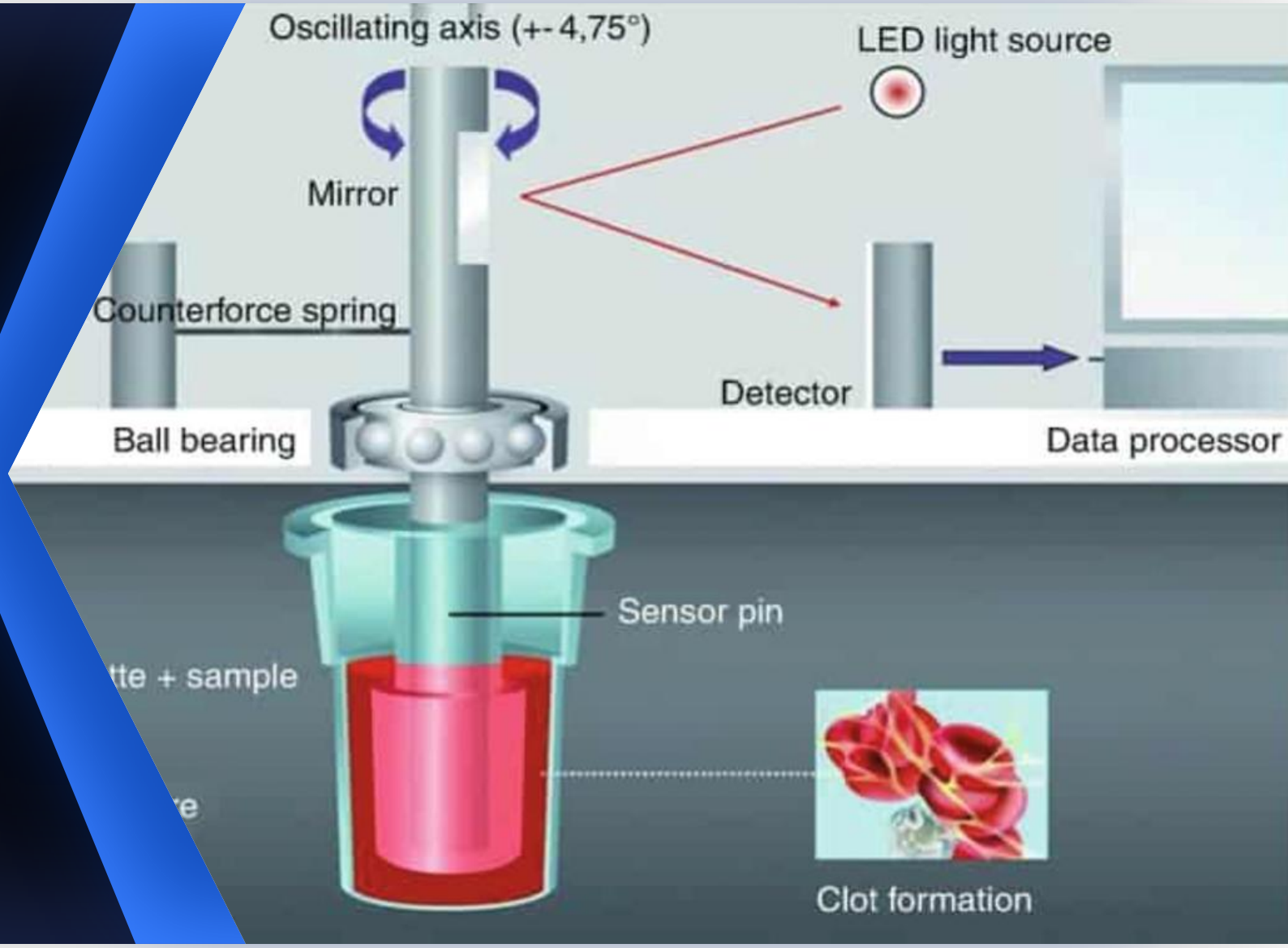
1) How does ROTEM work?

ROTEM delta consists of

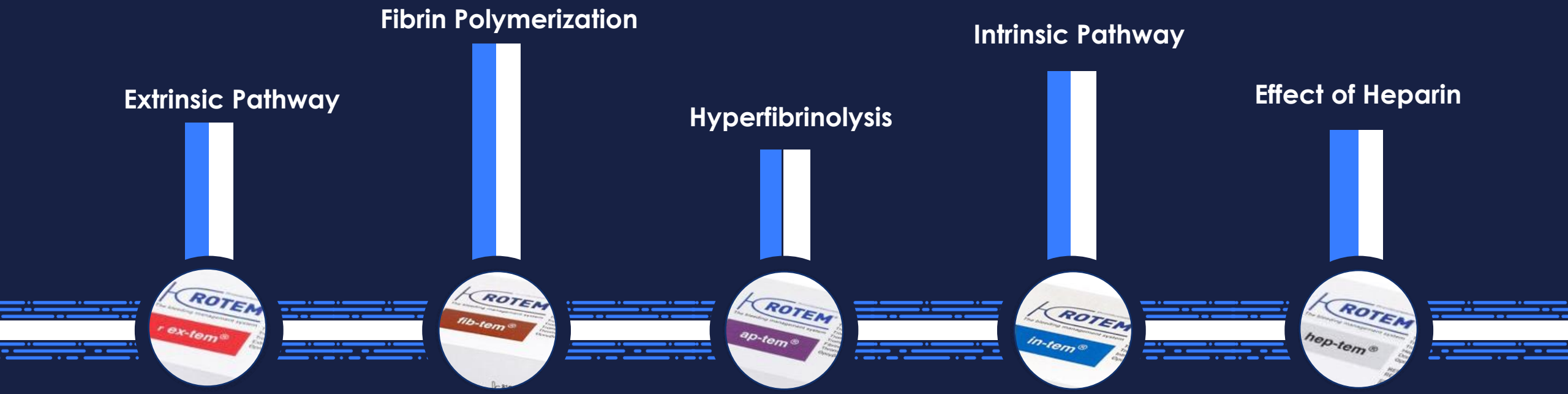
- Four temperature-adjusted independent measurement channels
- Software-assisted automatic pipette

Technical Aspect

Inside of a measurement unit



ROTEM Assays



EXTEM
$CaCl_2$ +
rTF +
polybrene

FIBTEM
EXTEM +
cytochalasin D

APTEM
EXTEM +
Aprotinin /TXA

INTEM
$CaCl_2$ +
Ellagic acid

HEPTEM
INTEM +
Heparinase


ROTEM
star-tem®20
REF 503-10
2°C 8°C
2013-04
LOT 41436401
10 x 20
star-tem®20


ROTEM
r ex-tem®
REF 503-05
2°C 8°C
2011-04
LOT 41435901
10 x 10
r ex-tem®


ROTEM
fib-tem®
REF 503-06
2°C 8°C
2013-08
LOT 41491301
10 x 5
fib-tem®

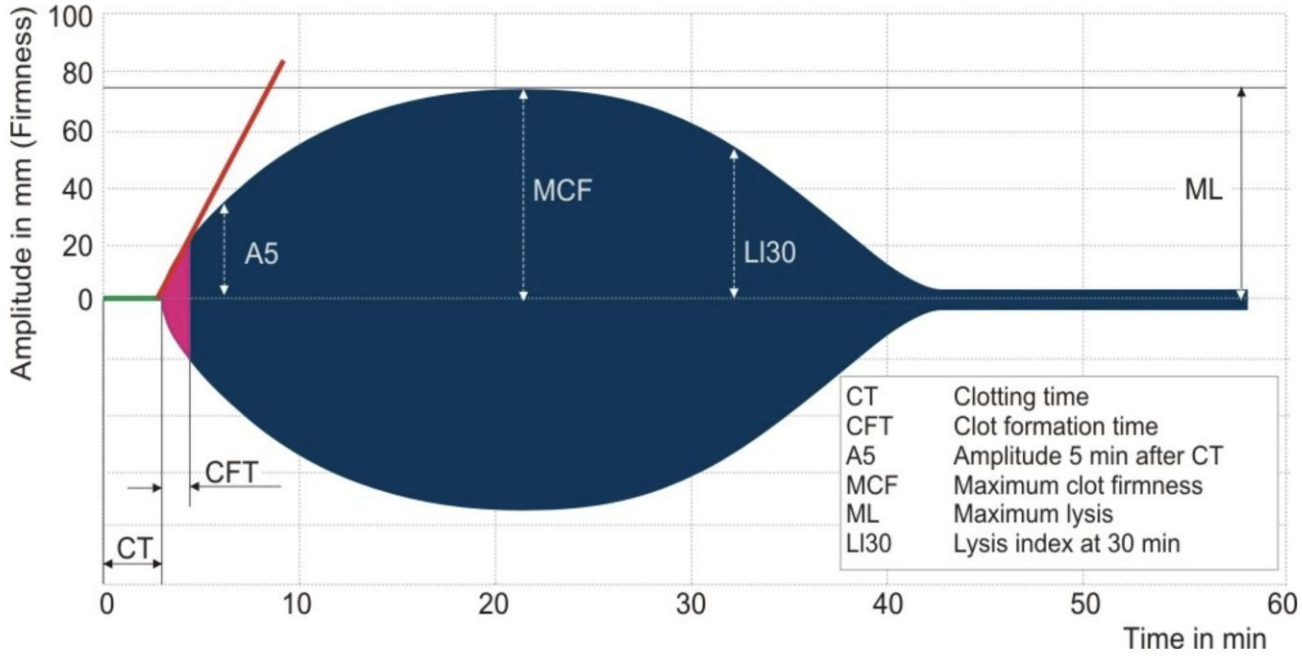

ROTEM
ap-tem®
REF 503-04
2°C 8°C
2013-03
LOT 41433701
10 x 5
ap-tem®
IVD


ROTEM
in-tem®
REF 503-02
2°C 8°C
2013-03
LOT 41433601
10 x 10
in-tem®


ROTEM
hep-tem®
REF 503-09
2°C 8°C
LOT
10 x 7
hep-tem®
hep-tem® Lyo
hep-TEM® Dil

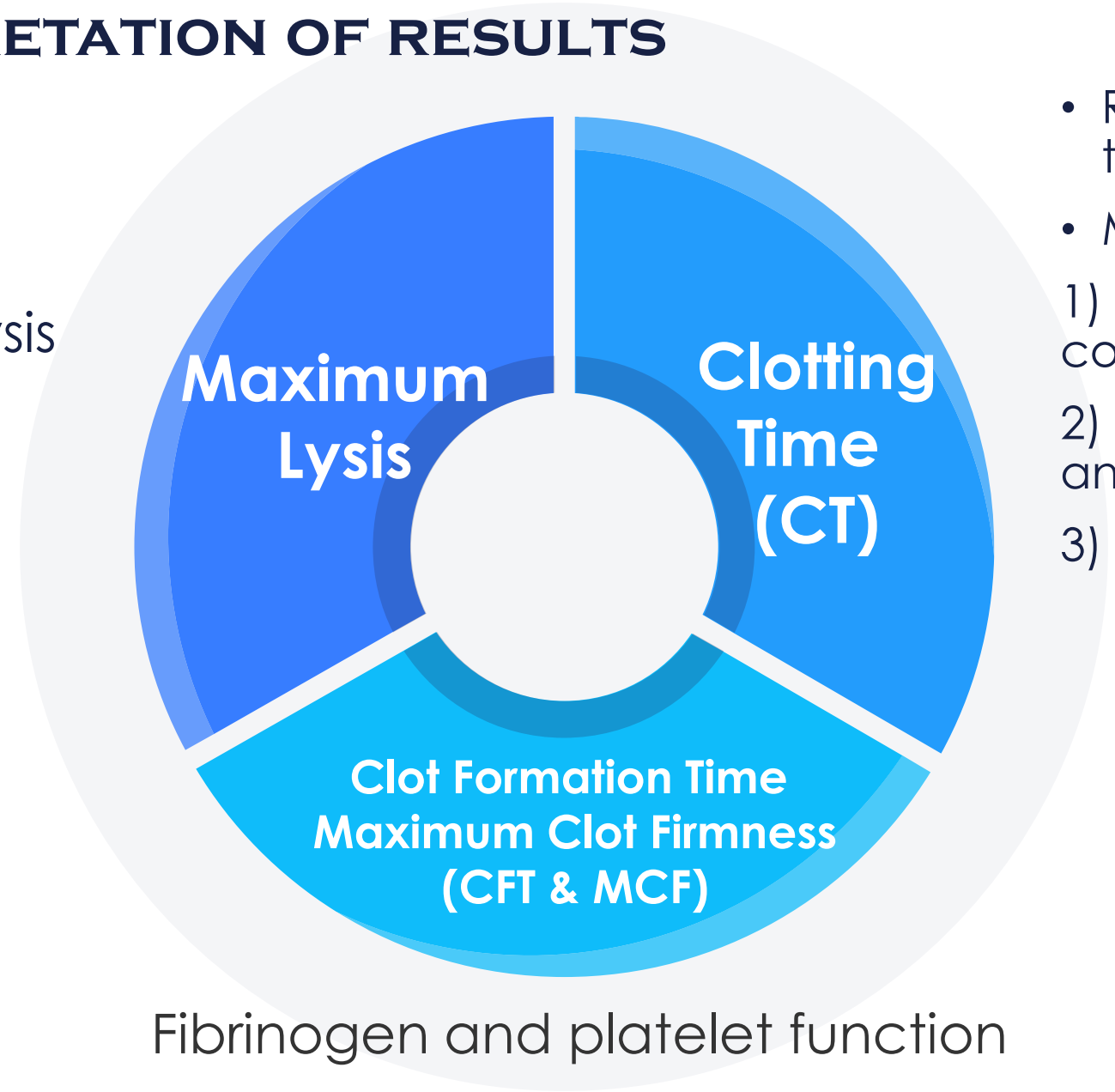
2) Results of ROTEM

- CT: Clotting time
- CFT: Clot formation time (s)
- A5: Clot strength value in time of 5 min from CT (mm)
- **MCF: maximum clot firmness (mm)**
- LI30: Residual clot firmness at 30 min after CT (described in % of MCF)
- ML—maximum clot lysis (%)



3) Interpretation of results

Fibrinolysis



Fibrinogen and platelet function

- Reflects the speed of thrombin generation
- Mainly affected by

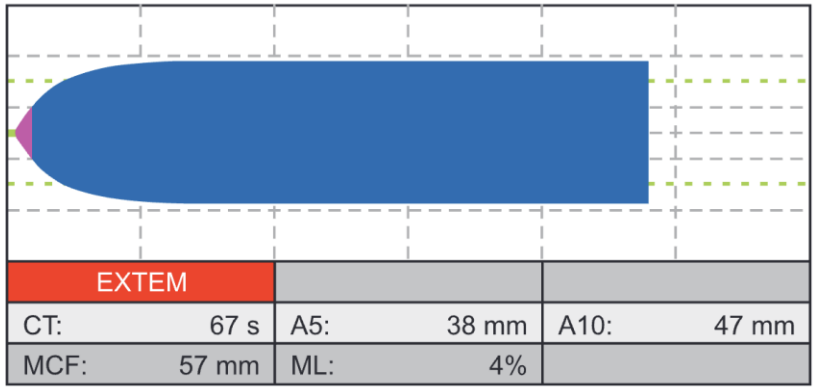
1) Enzymatic activity of coagulation factors

2) Concentration of anticoagulants

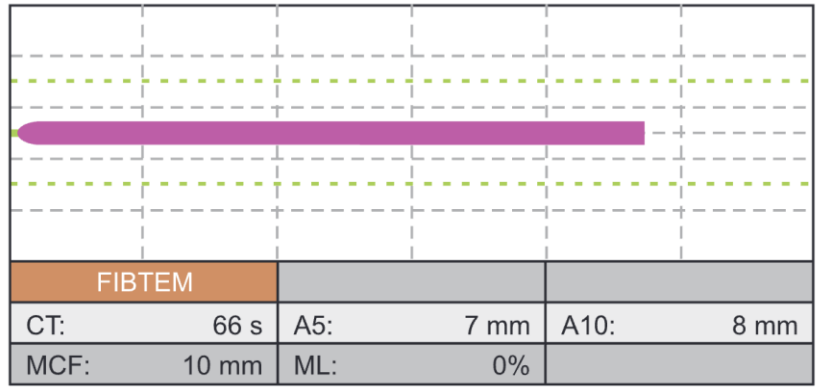
3) level of fibrinogen

Normal clot:

CT_{EX}	43–82 s
$A5_{EX}$	33–52 mm
MCF_{EX}	52–70 mm
ML_{EX} or ML_{FIB}	< 15%
$LI60_{EX}$ or $LI60_{FIB}$	> 85%
$A5_{FIB}$	5–20 mm
MCF_{FIB}	7–24 mm



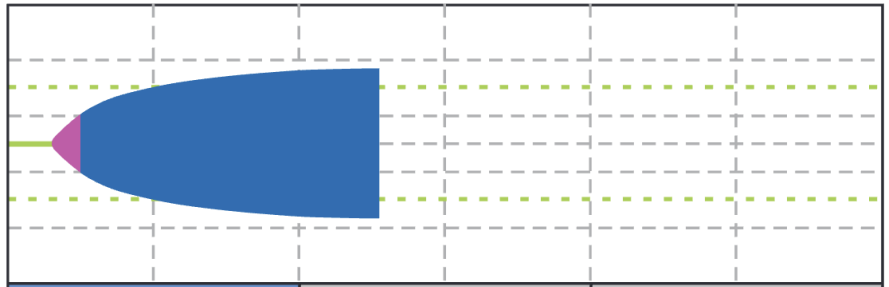
EXTEM		
CT: 67 s	A5: 38 mm	A10: 47 mm
MCF: 57 mm	ML: 4%	



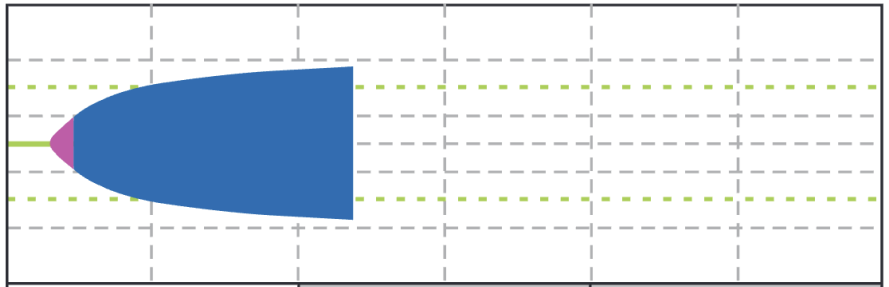
FIBTEM		
CT: 66 s	A5: 7 mm	A10: 8 mm
MCF: 10 mm	ML: 0%	

Normal clot (adequate heparin-reversal with protamine after CPB):

CT_{IN}	122–208 s
$A5_{IN}$	33–52 mm
MCF_{IN}	51–72 mm
CT_{IN}/CT_{HEP}-ratio	0.9–1.1



INTEM	ST: 13:50	
CT: 192 s	A5: 34 mm	A10: 43 mm
MCF: 53 mm	ML: 0%	



HEPTEM	ST: 13:52	
CT: 188 s	A5: 35 mm	A10: 44 mm
MCF: 54 mm	ML: 0%	