Basics of Pacemaker Timing Cycles and Diagnostics: Uses and Interpretations

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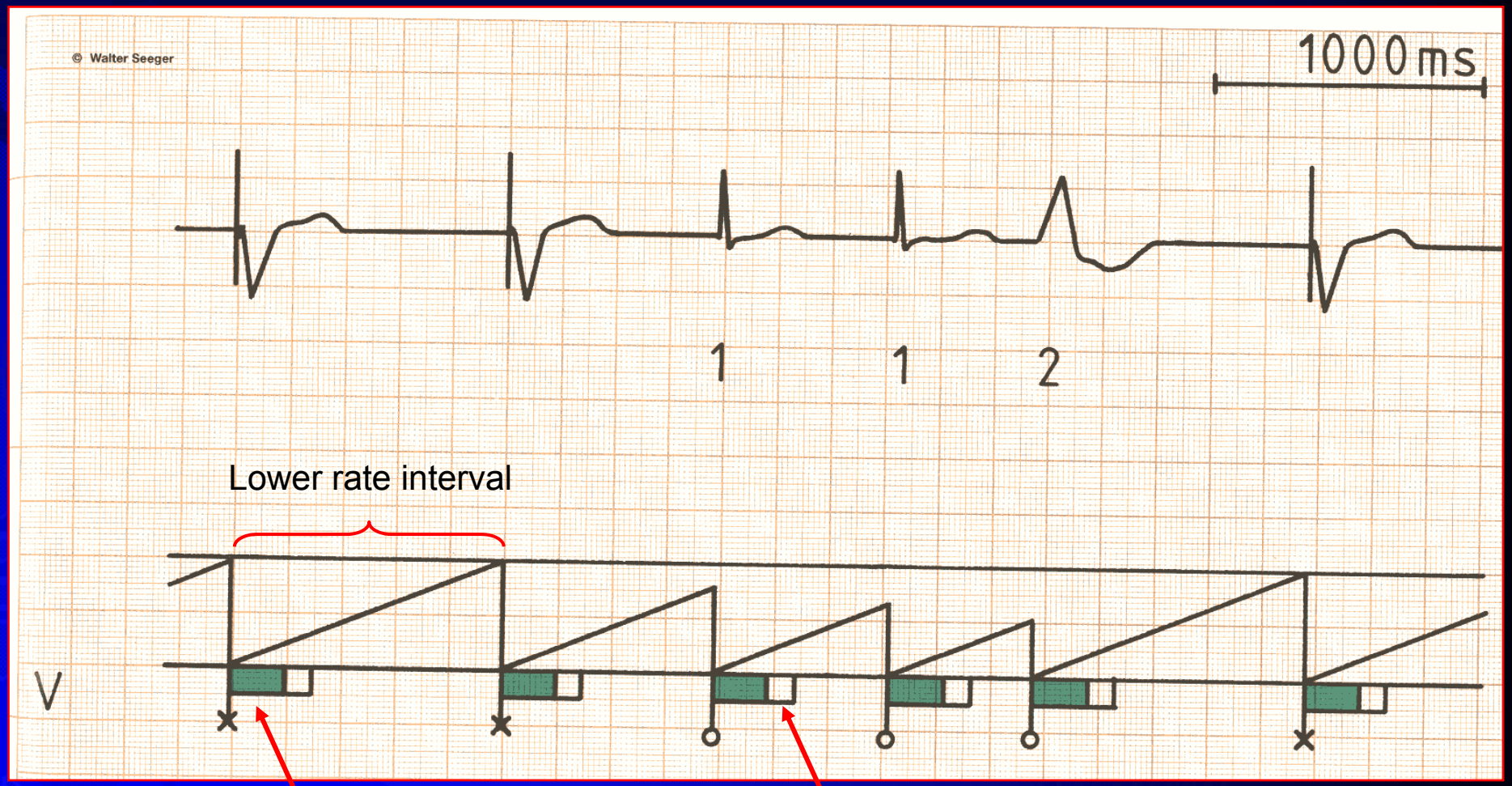
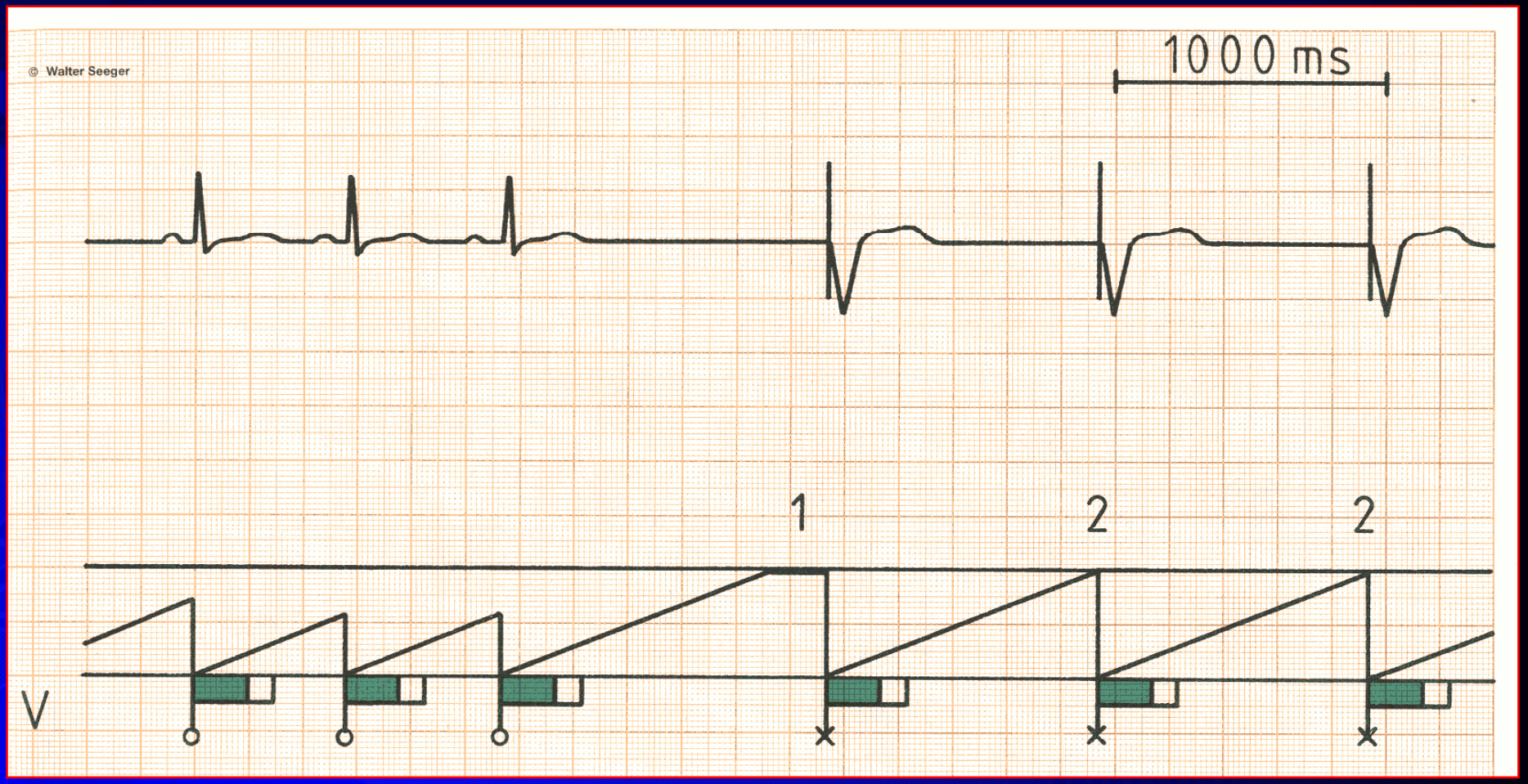
VVI Pacing



(Postventricular Ventricular) Blanking Period

(Postventricular Ventricular) Refractory Period

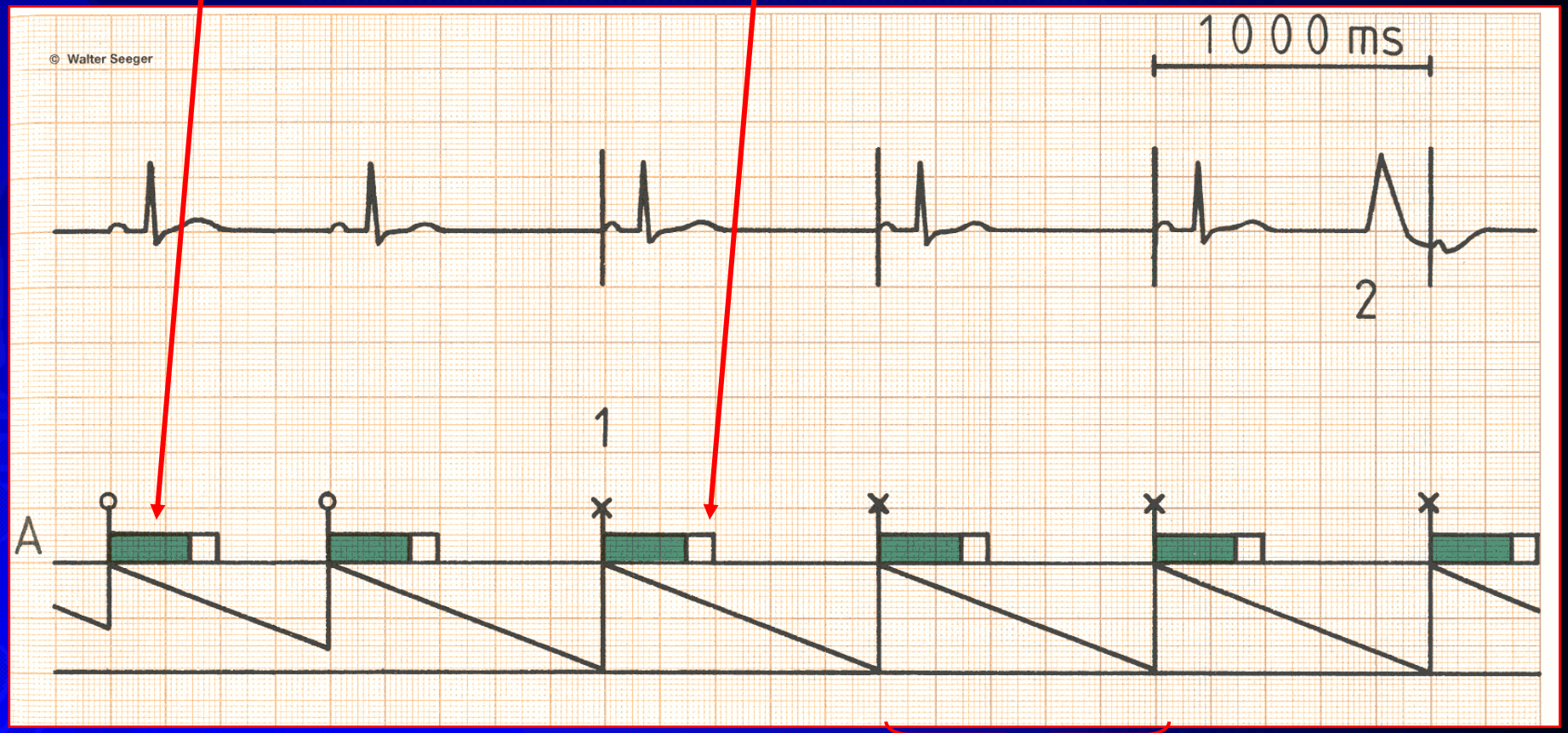
VVI Pacing with Hysteresis



AAI Pacing

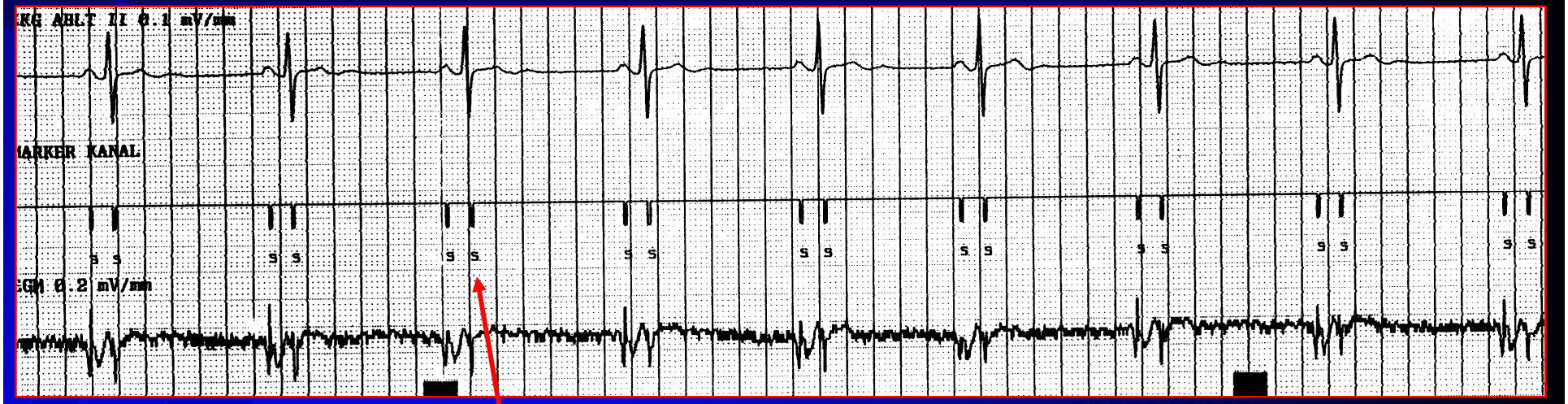
(Postatrial Atrial) Blanking Period

(Postatrial Atrial) Refractory Period



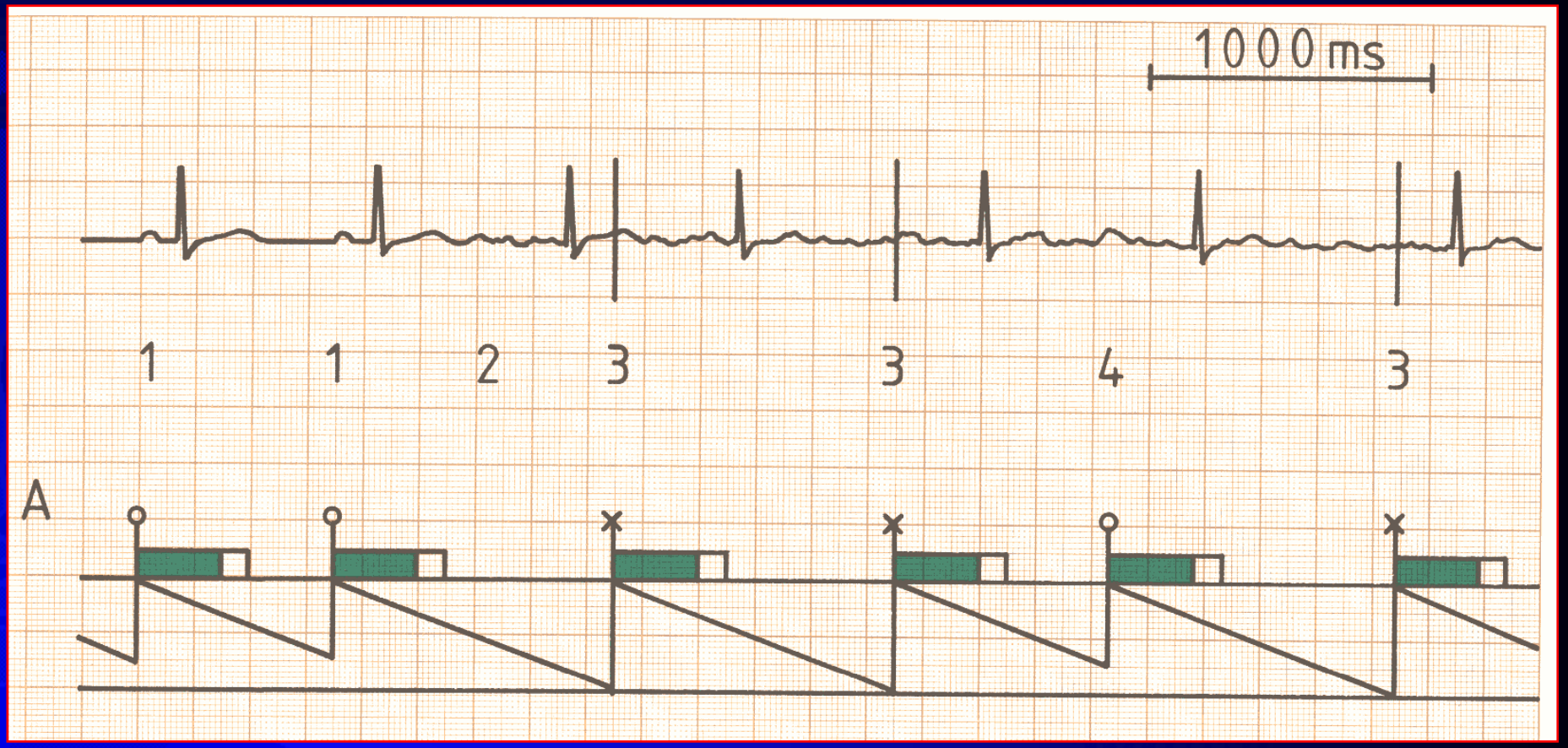
Lower rate interval

AAI Pacing



Oversensing of the QRS complex in the atrium
(ventricular farfield oversensing)

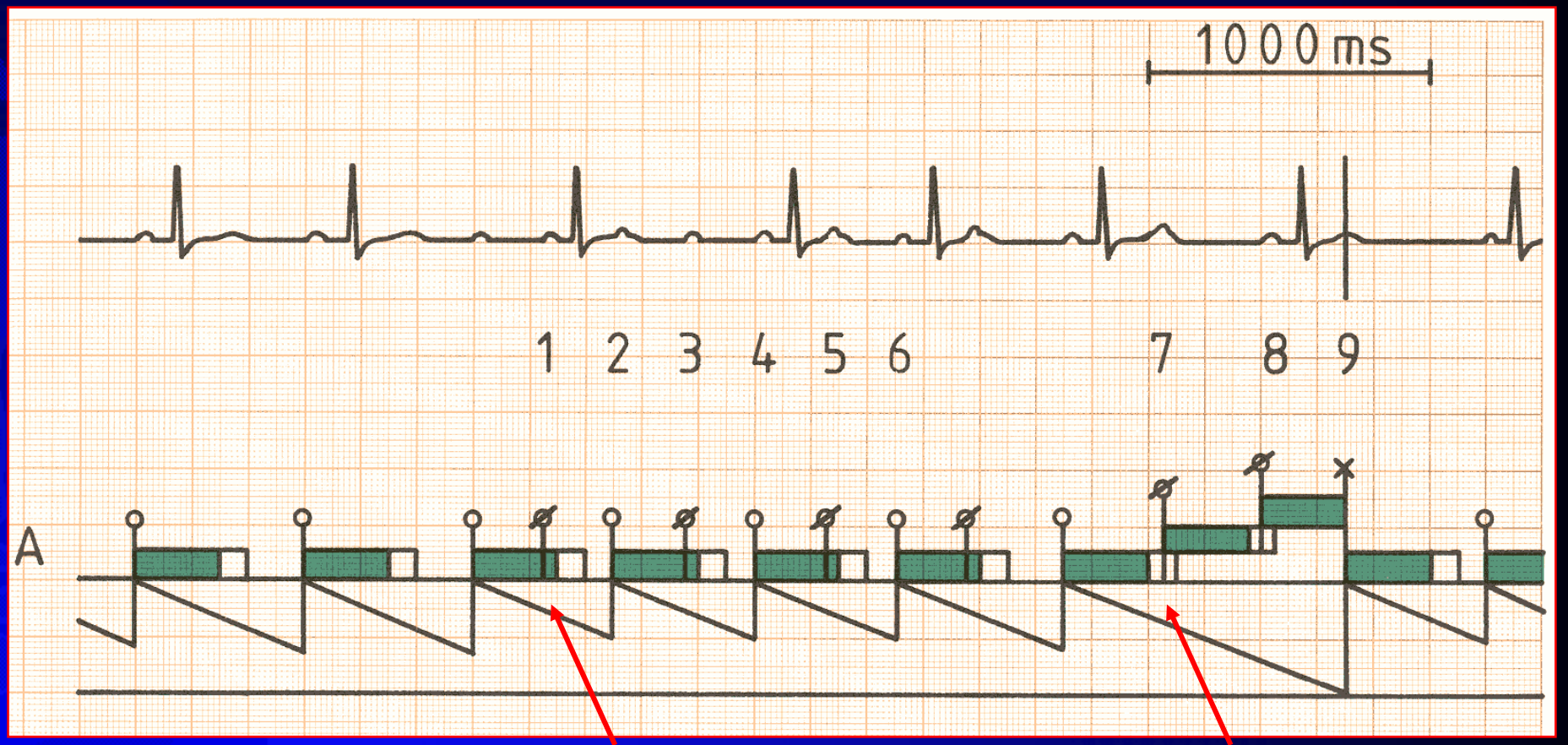
AAI-Stimulation



Lower rate interval

→ Undersensing of atrial fibrillation (true undersensing)

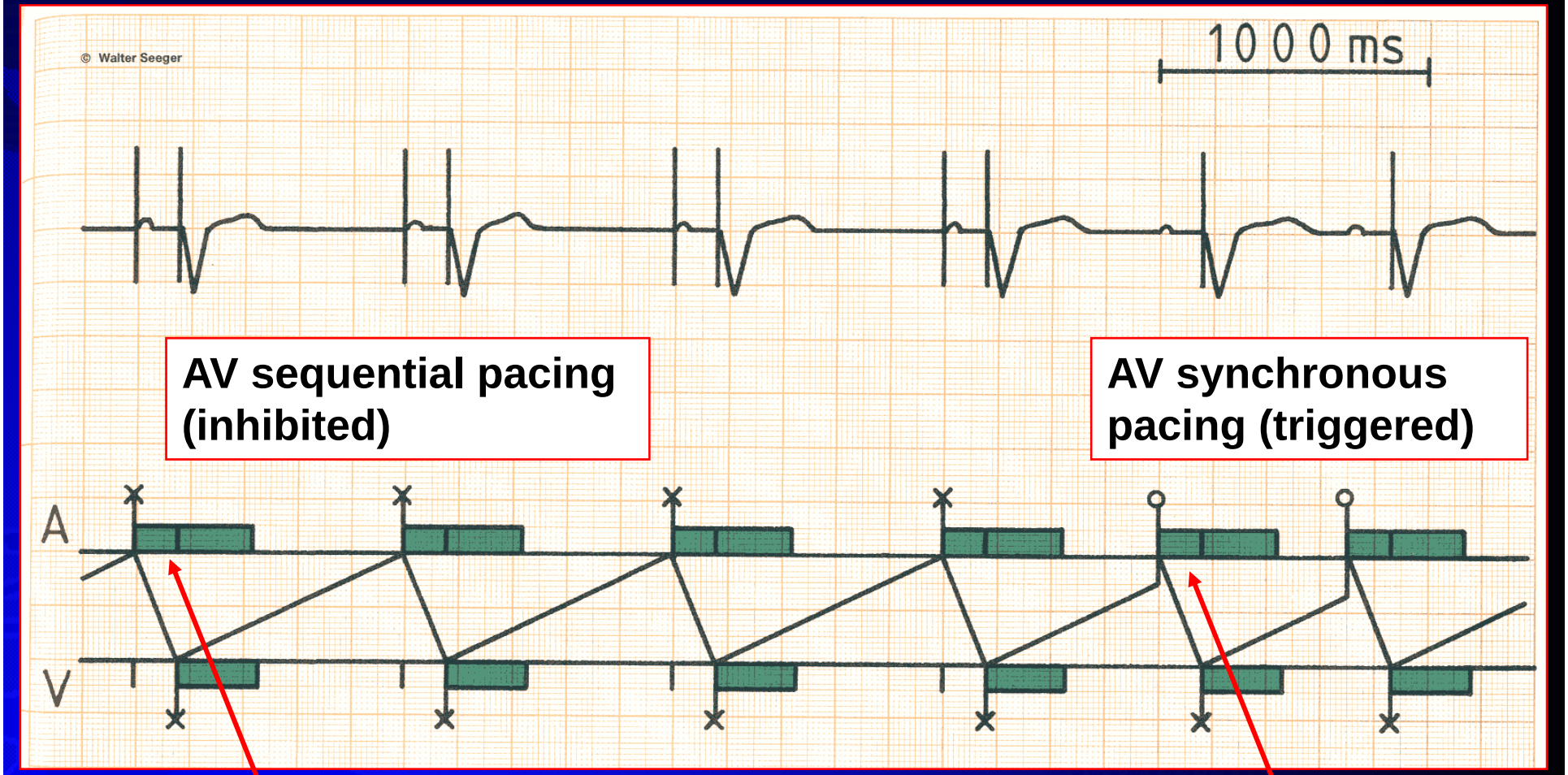
AAI-Stimulation



„Blanked“ Signal (Functional Undersensing)

Refractory Sensed Signal

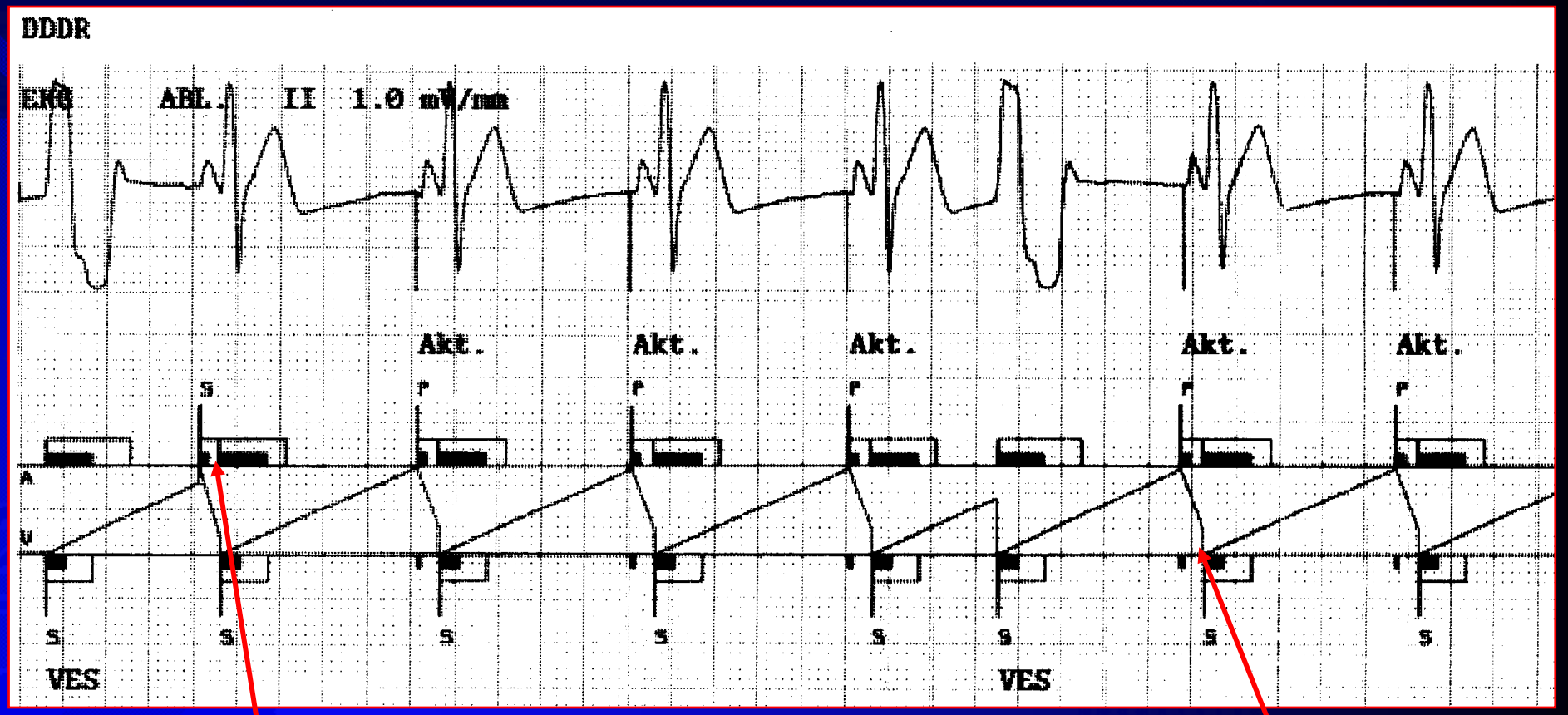
DDD Pacing



AV interval paced
- can be completely blanked
- can be only partially blanked

AV interval sensed

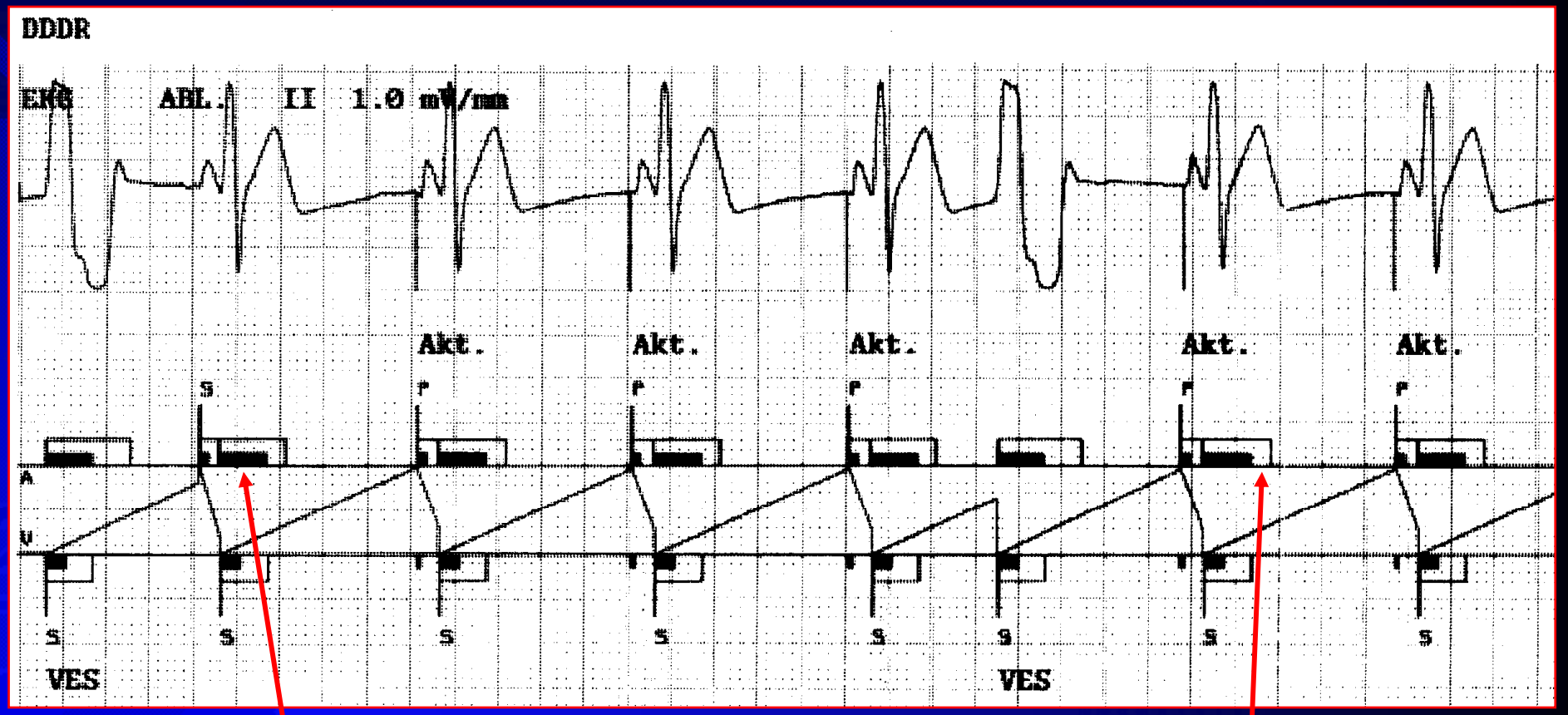
DDD Pacing



AV interval only partially blanked

AV interval sensed

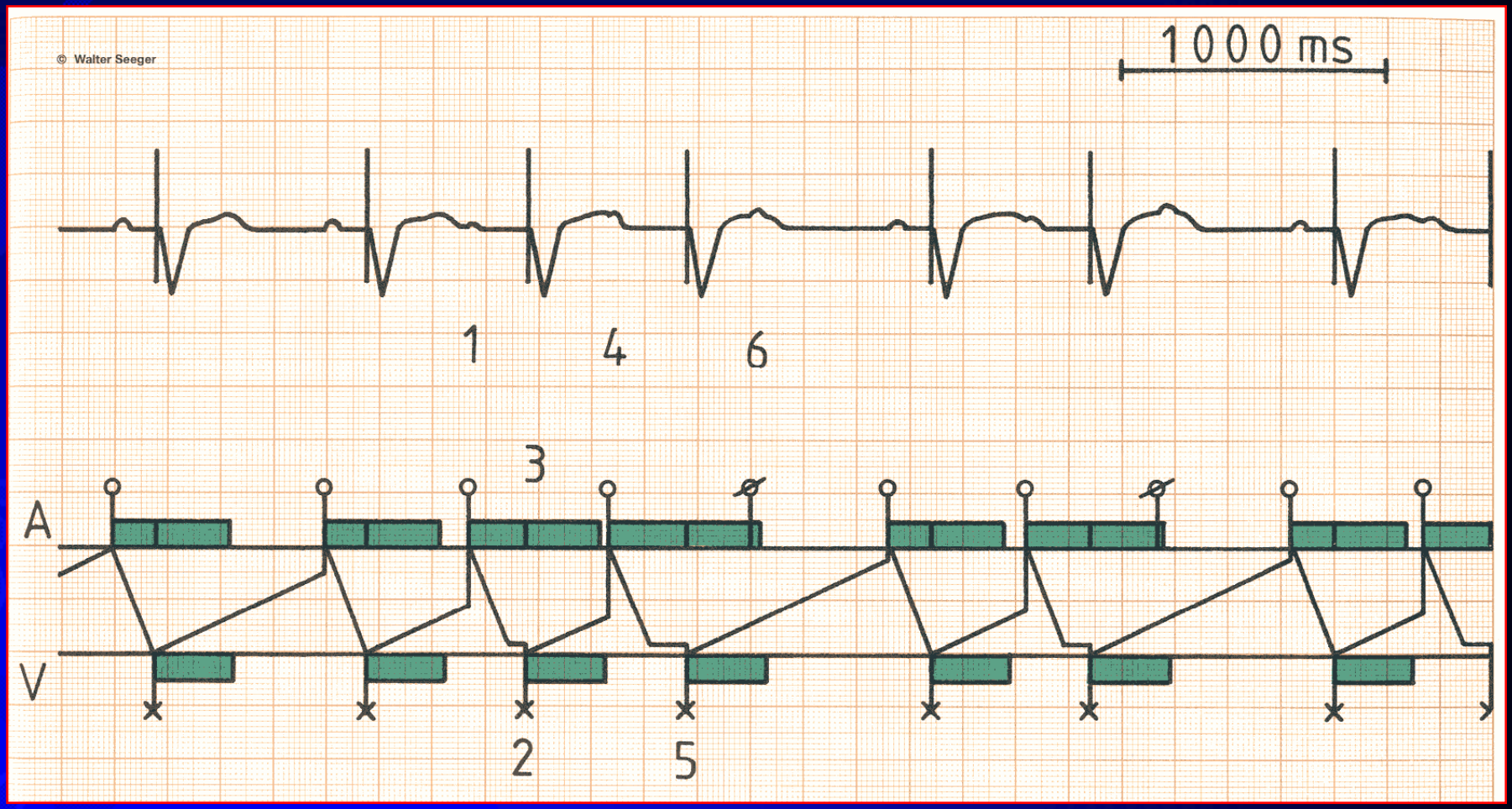
DDD Pacing



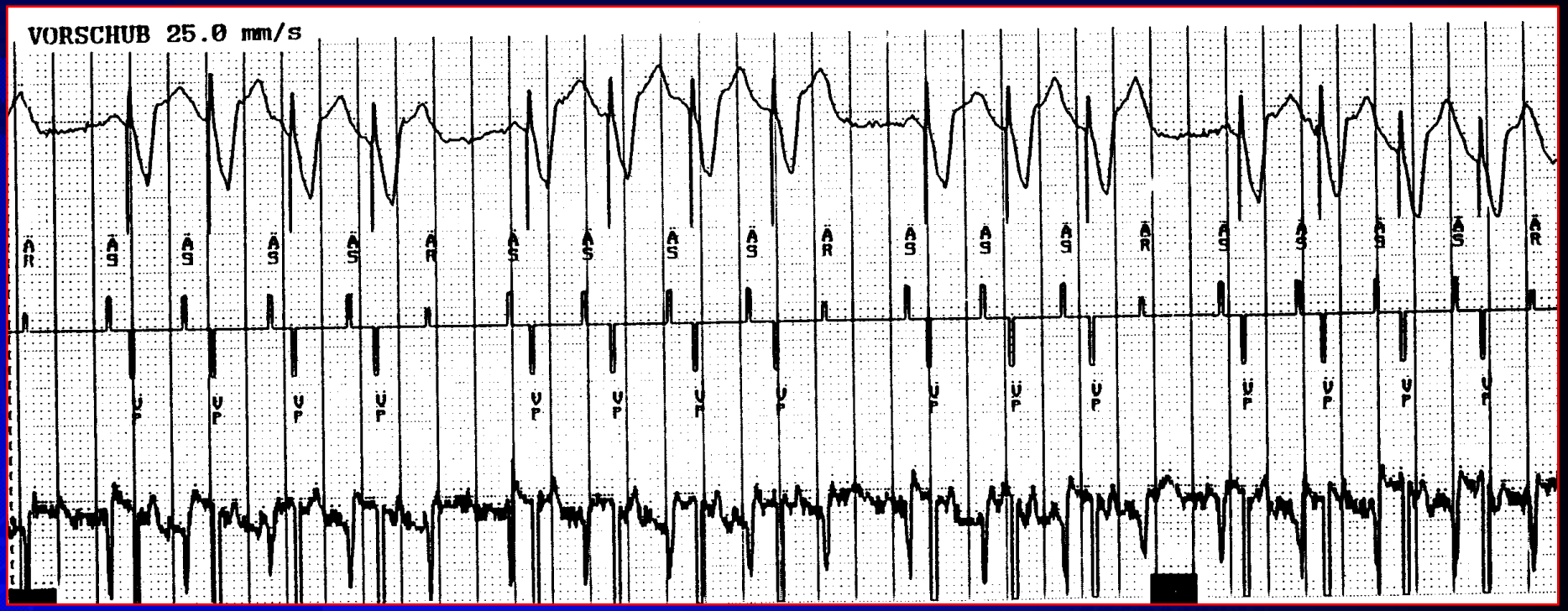
Postventricular atrial blanking (PVAB, black)

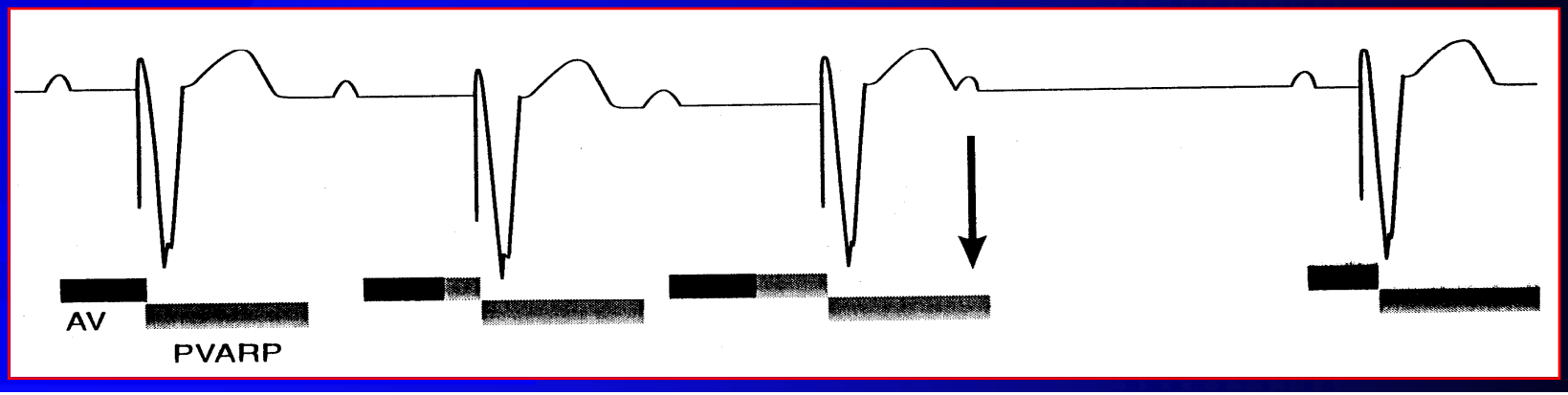
Postventricular atrial refractory period (PVARP, white)

DDD Wenckebach
Upper Rate Behaviour

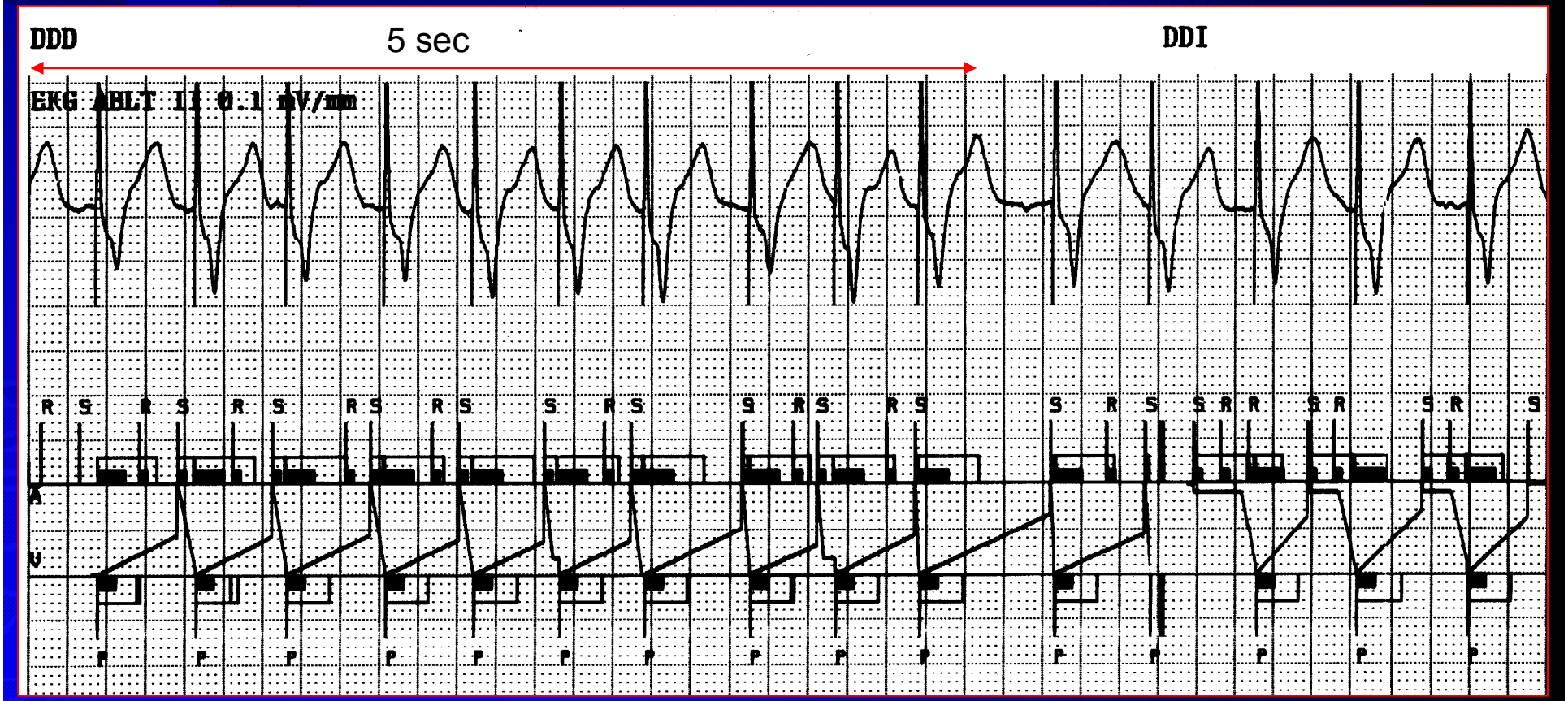


Wenckebach Upper Rate Behaviour



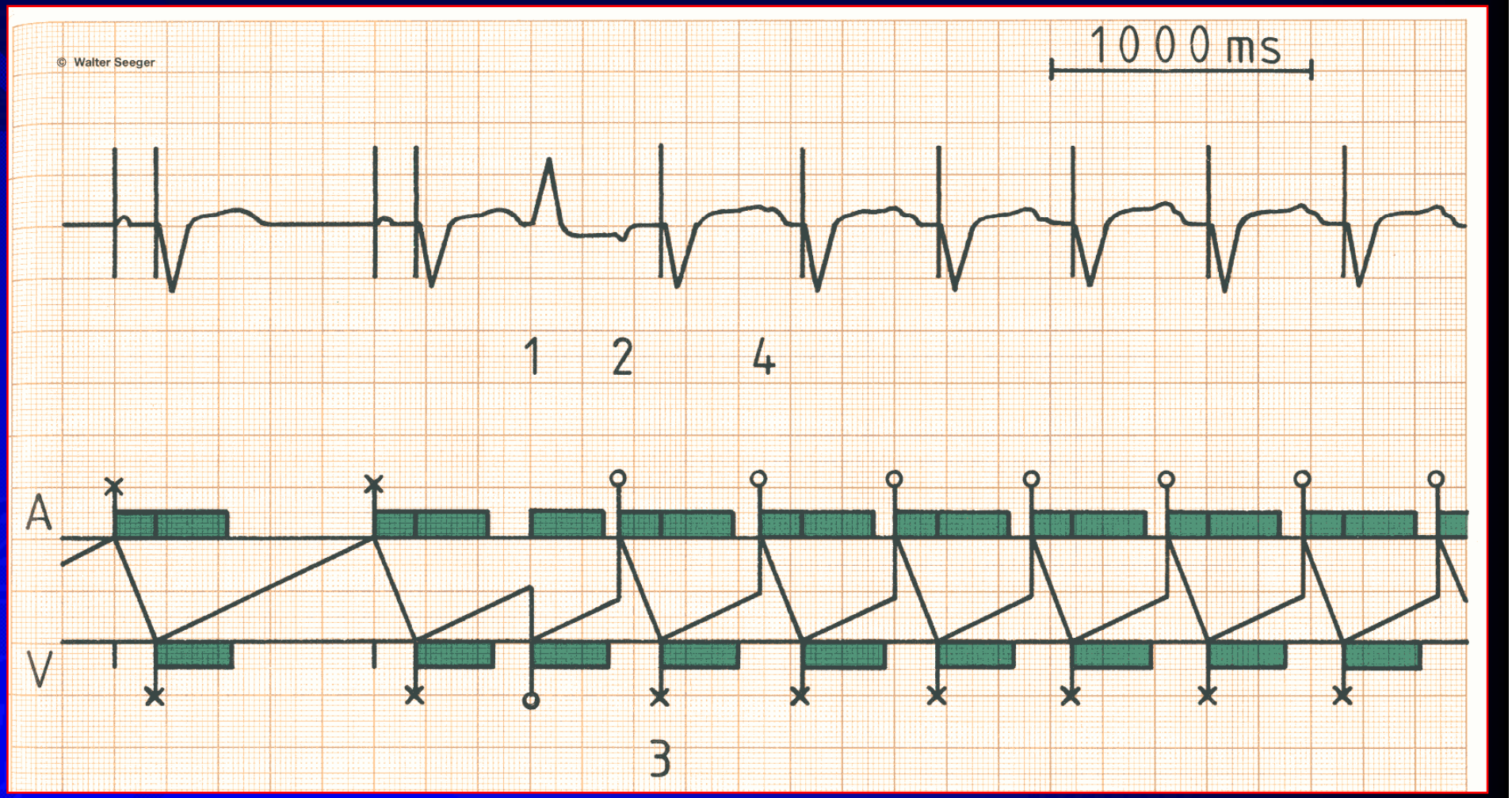


Automatic Mode Switching

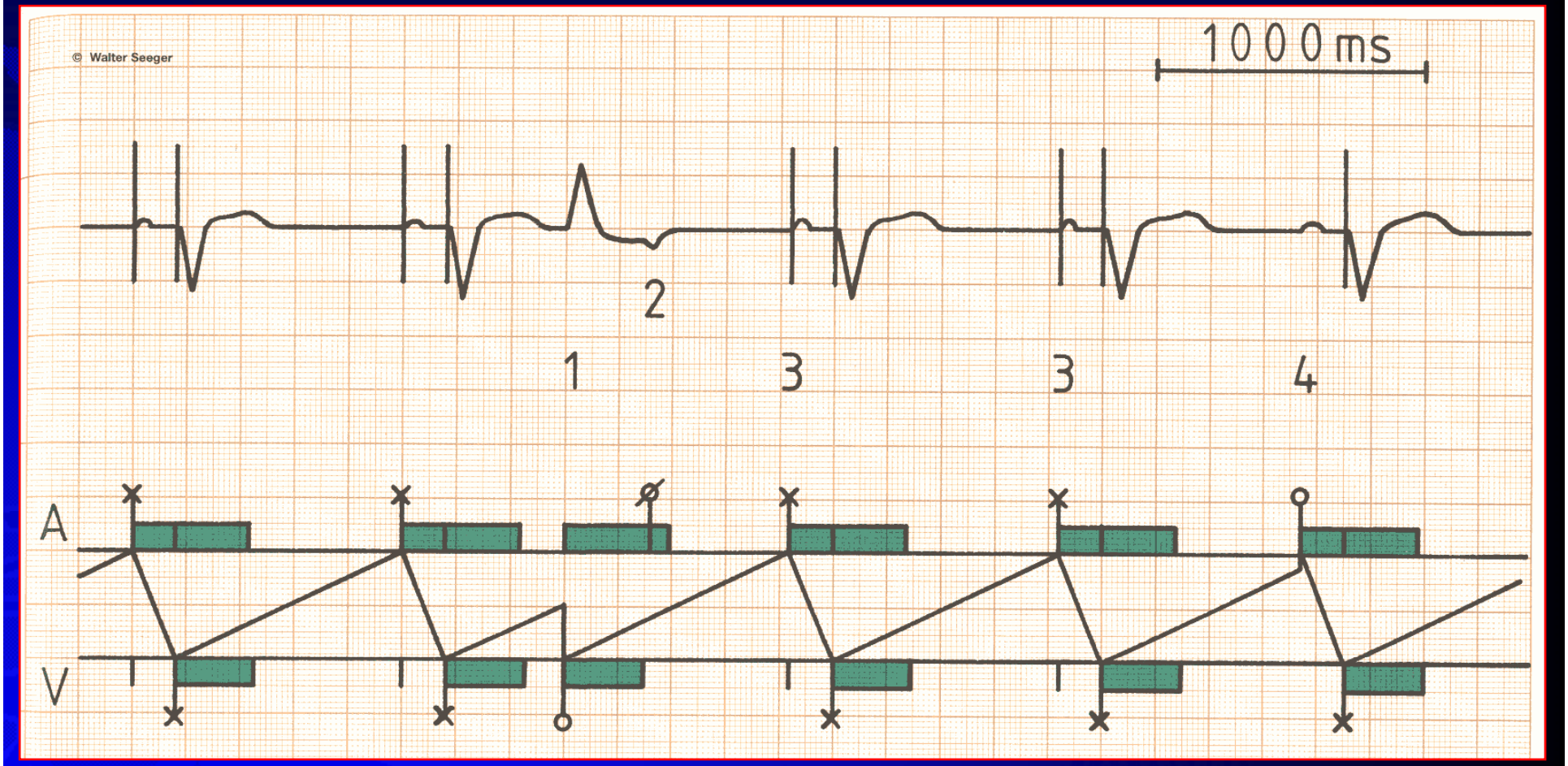


→ fast and irregular tracking of AT

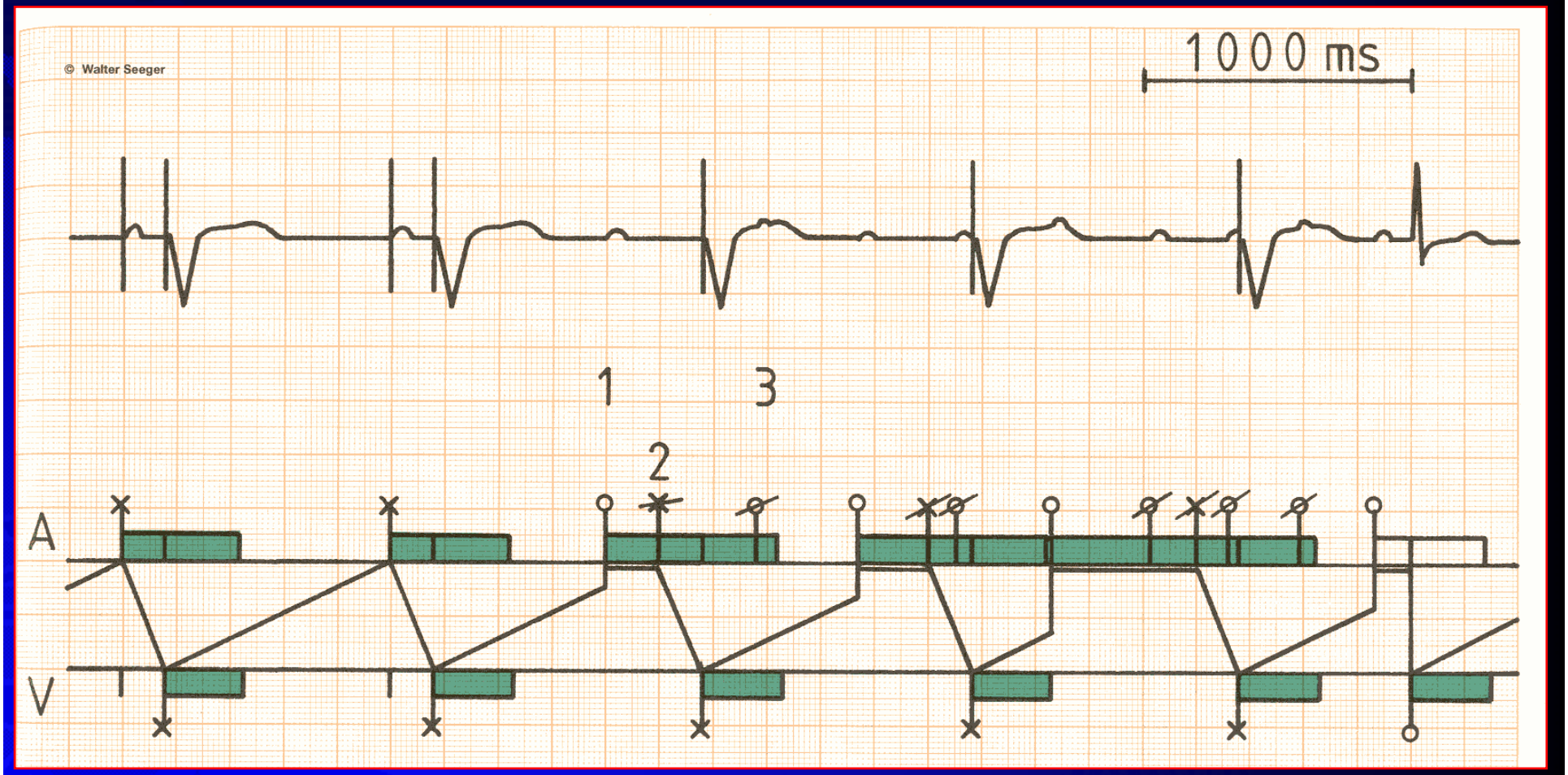
Endless-Loop-Tachycardia (ELT)



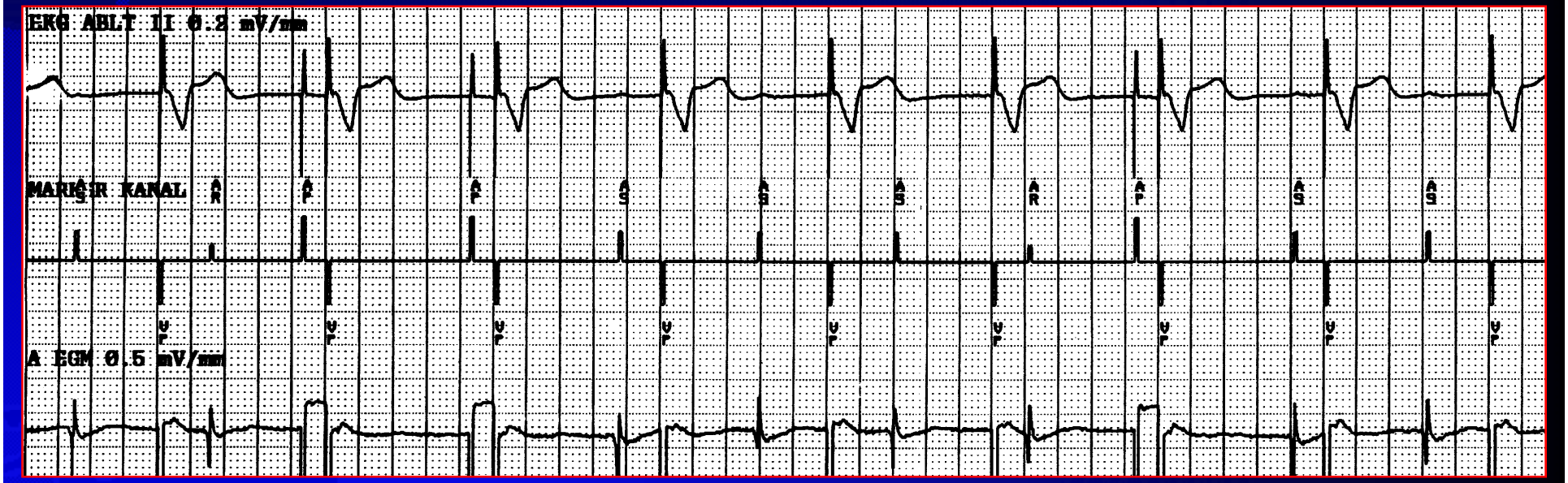
No Endless-Loop-Tachycardia (ELT)



DDI Pacing



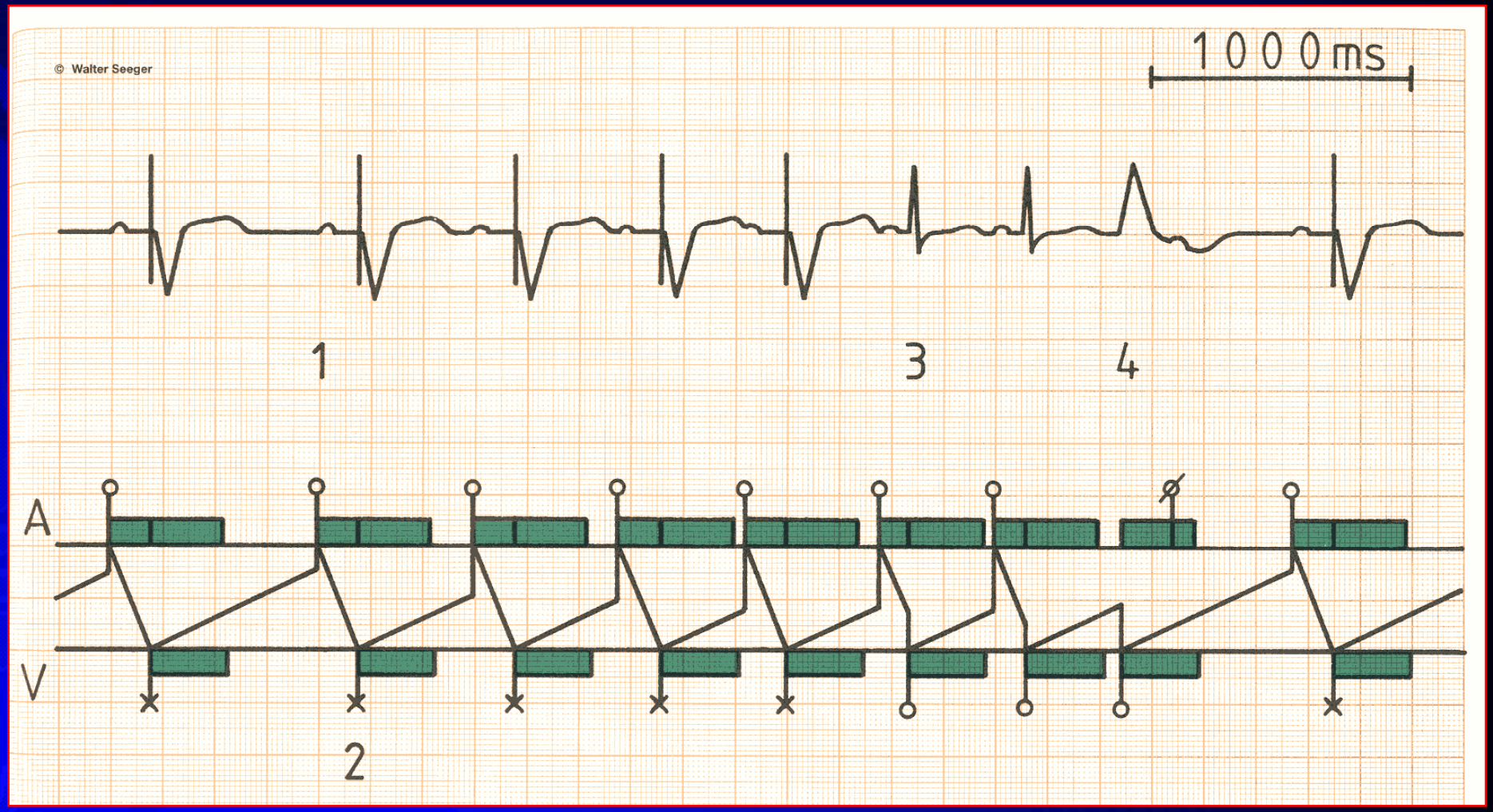
DDI Pacing



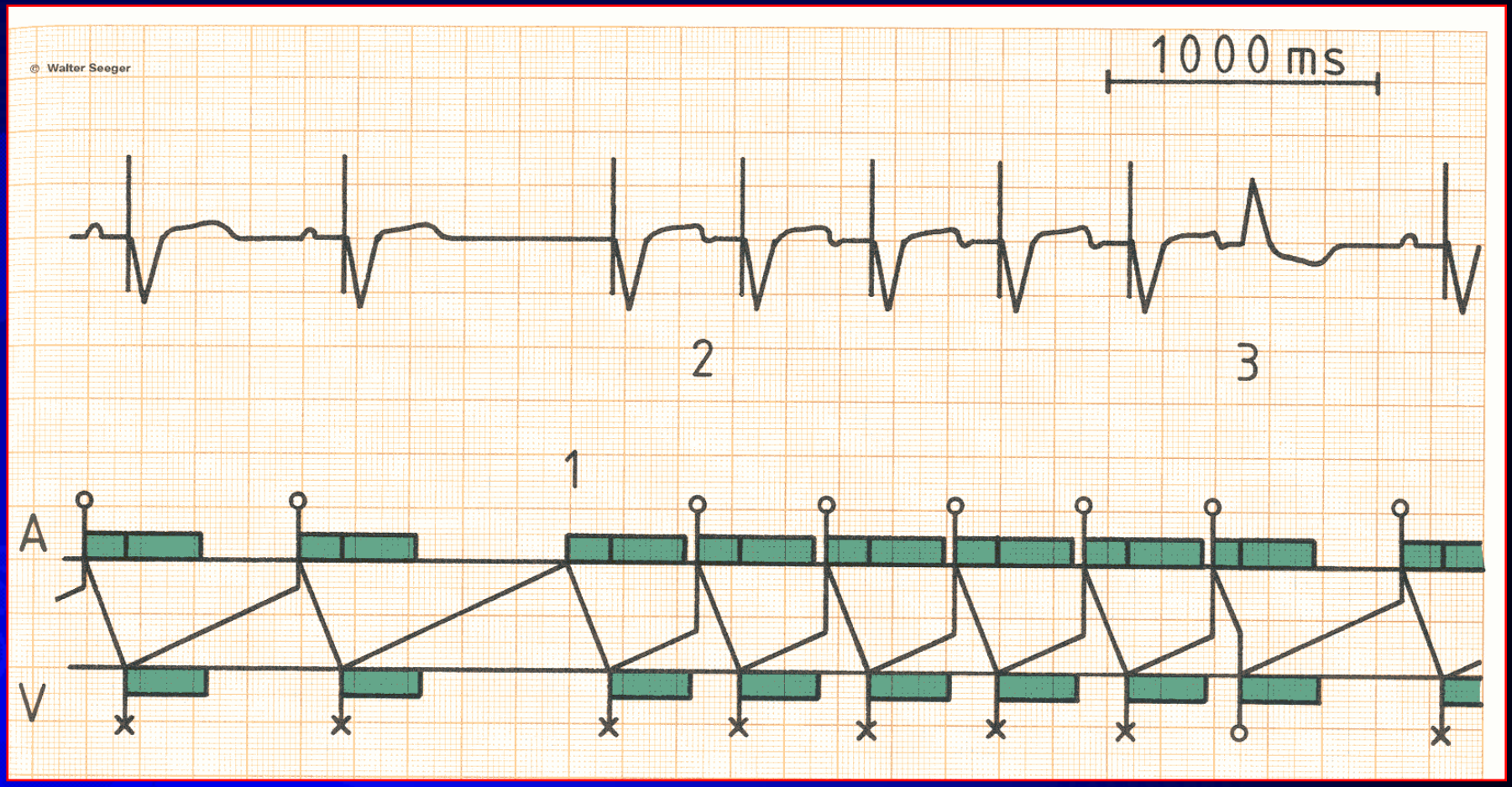
25 mm/s

DDIR, LRL 60/min

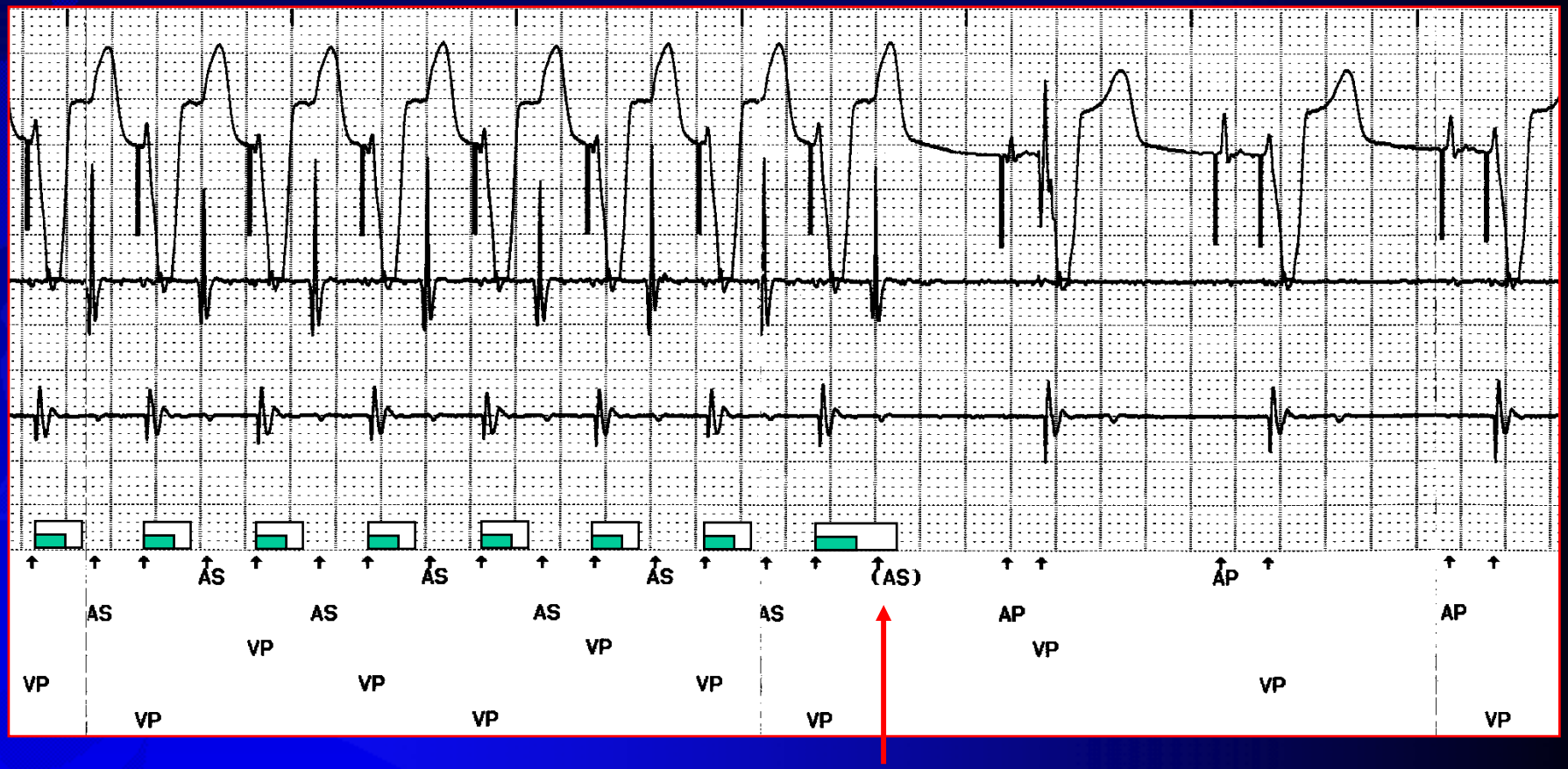
VDD Pacing



VDD Pacing with ELT

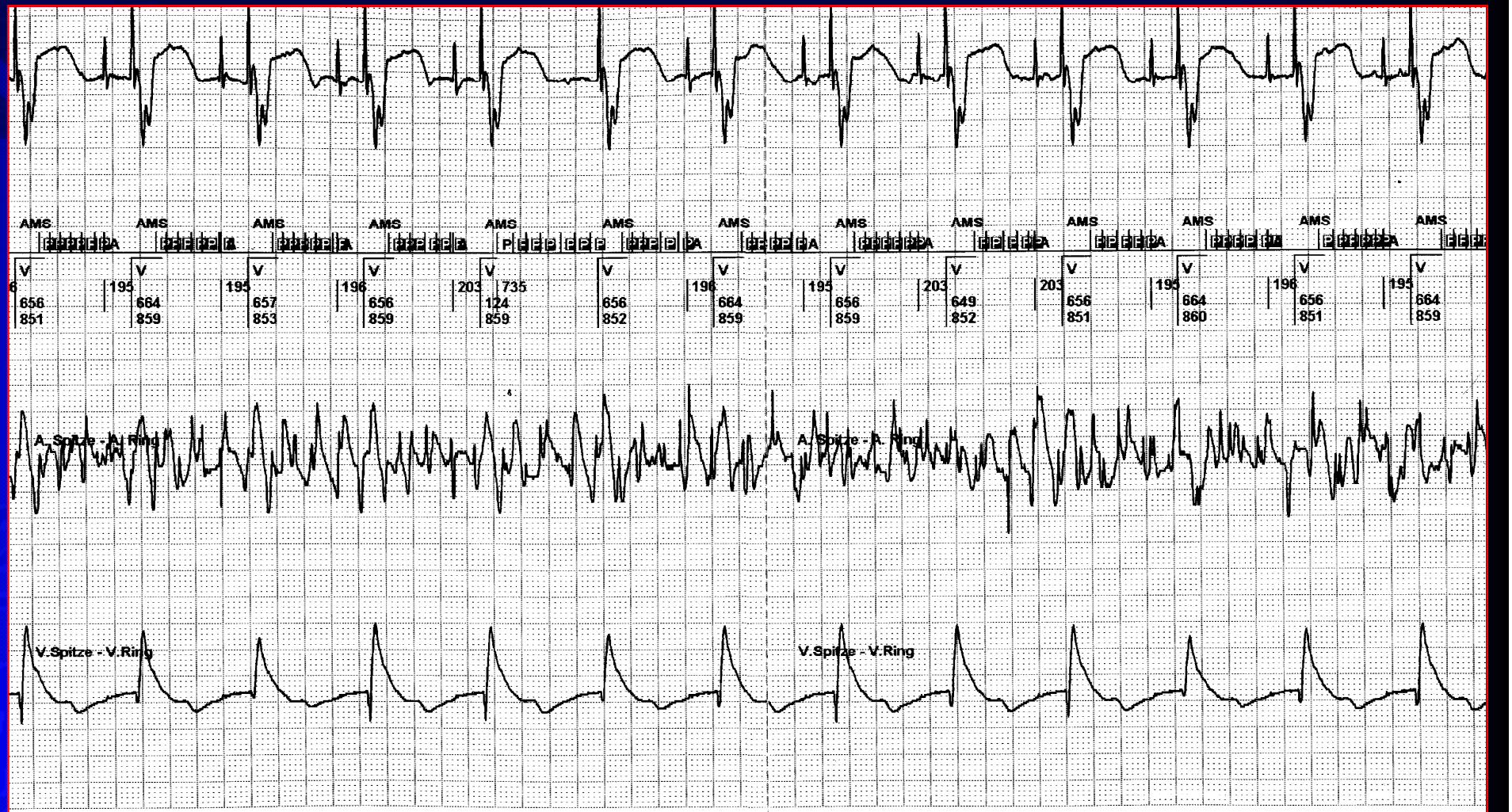


Endless-Loop-Tachycardia: Termination

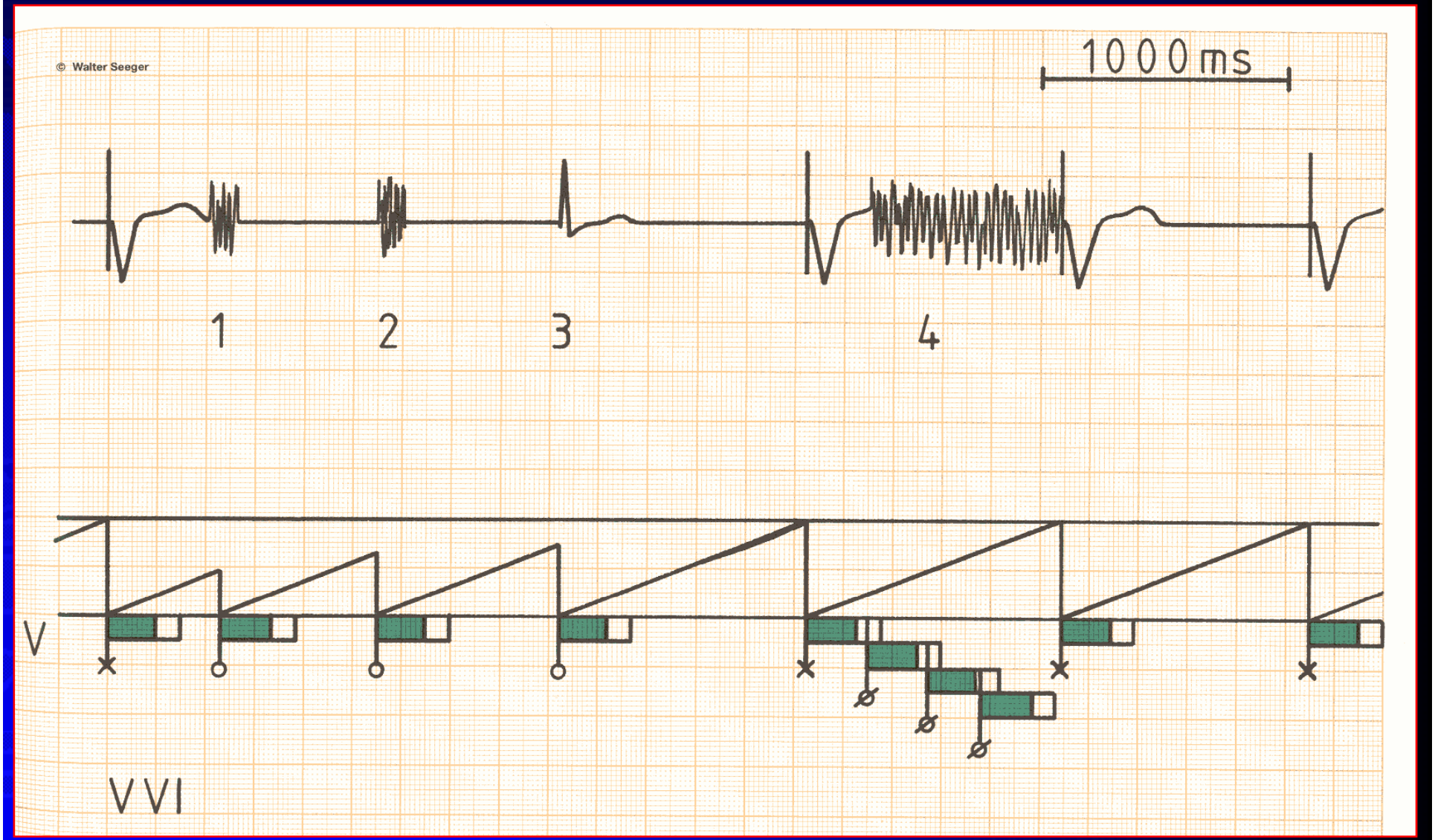


After x cycles of VP-AS: automatic PVARP extension
→ P wave no longer tracked, ELT stops

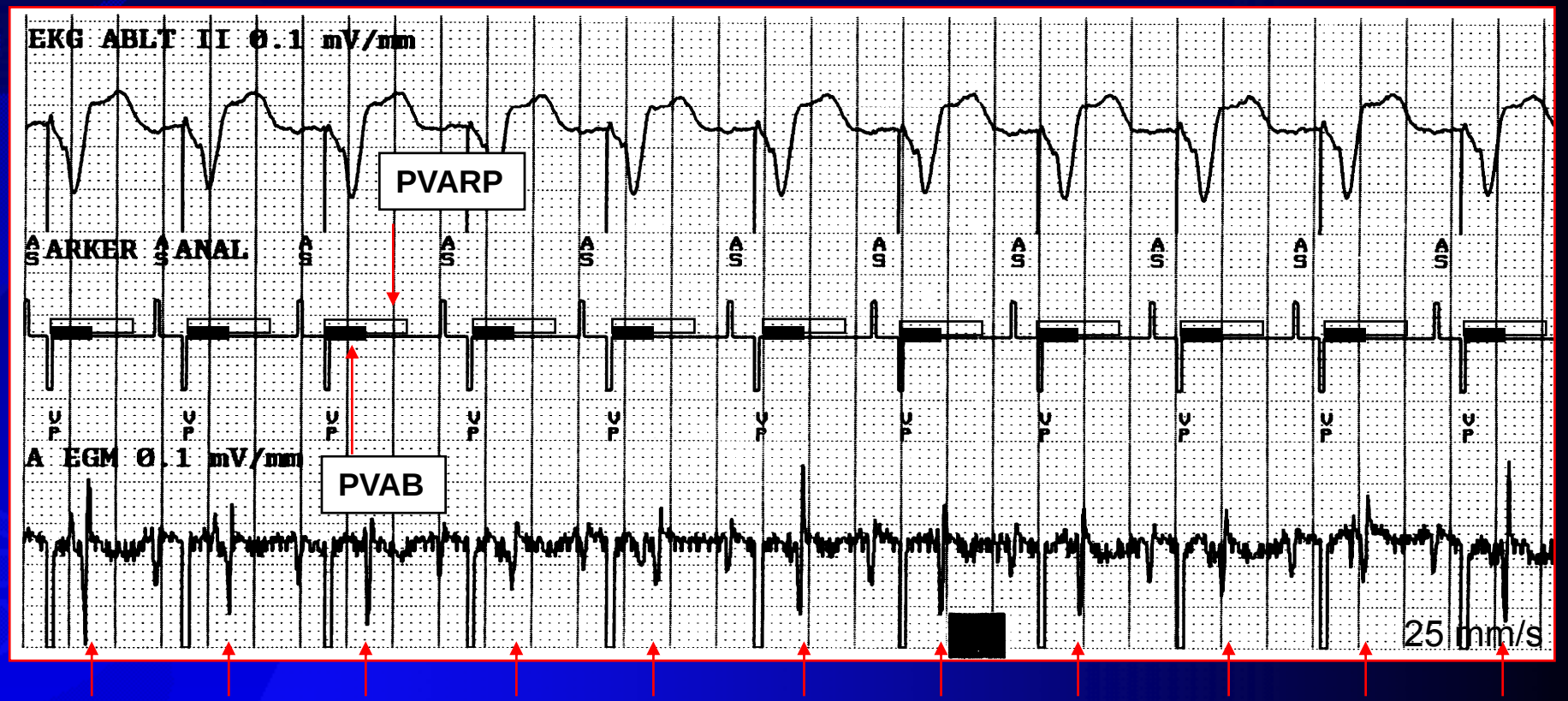
Noise Reaction



Noise Reaction

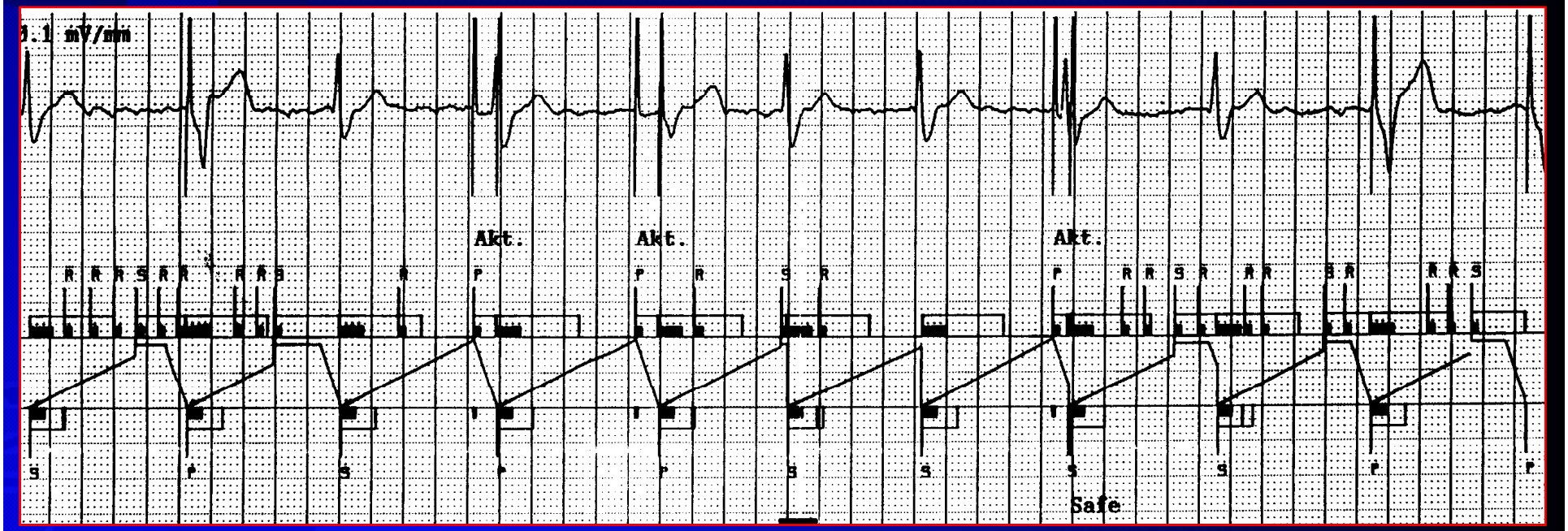


2:1 Lock-In of Atrial Flutter

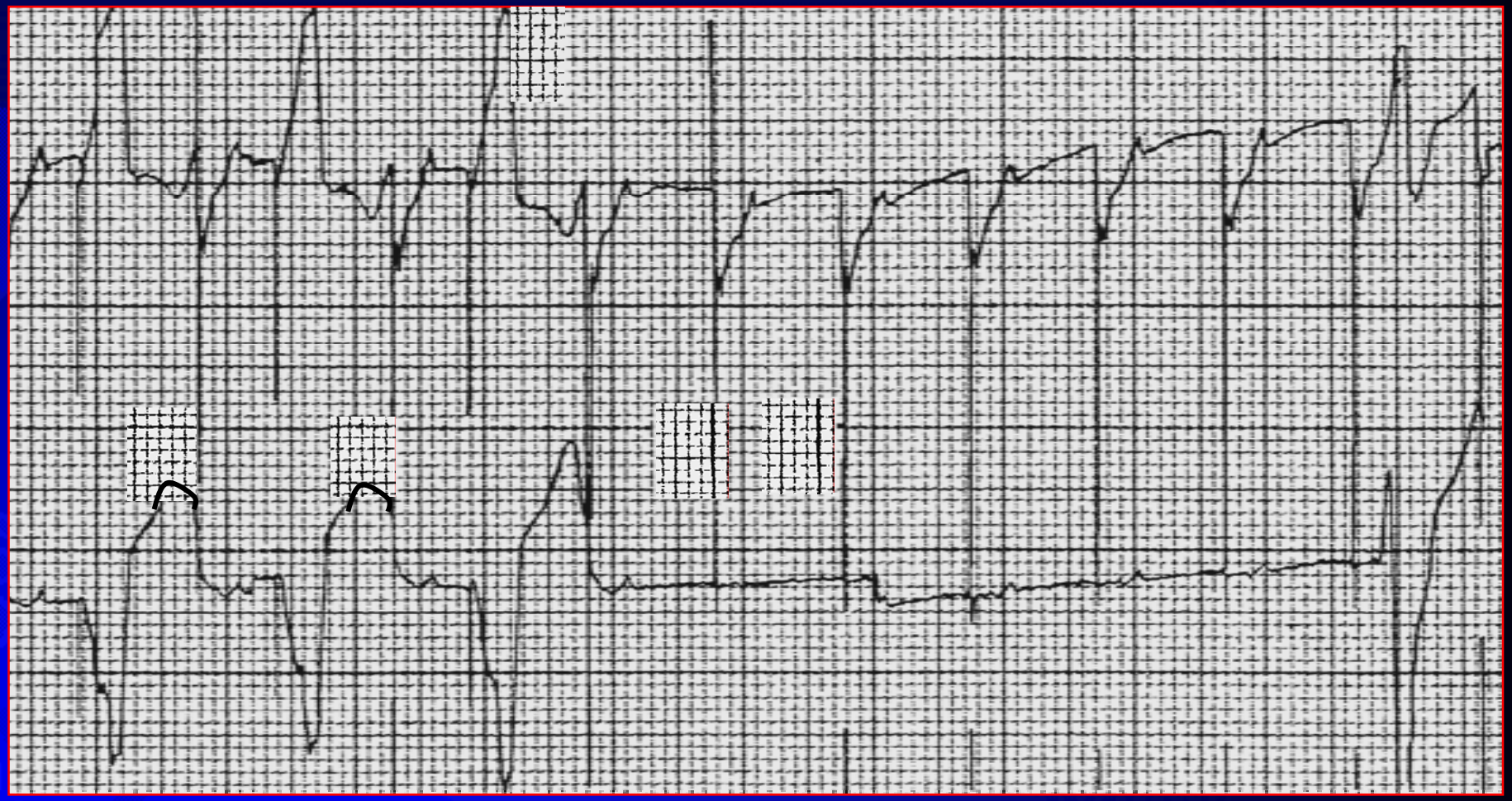


Atrial flutter with 2:1 undersensing (every 2nd flutter wave in PVAB) and 2:1 conduction by pacemaker

Safety Window Pacing

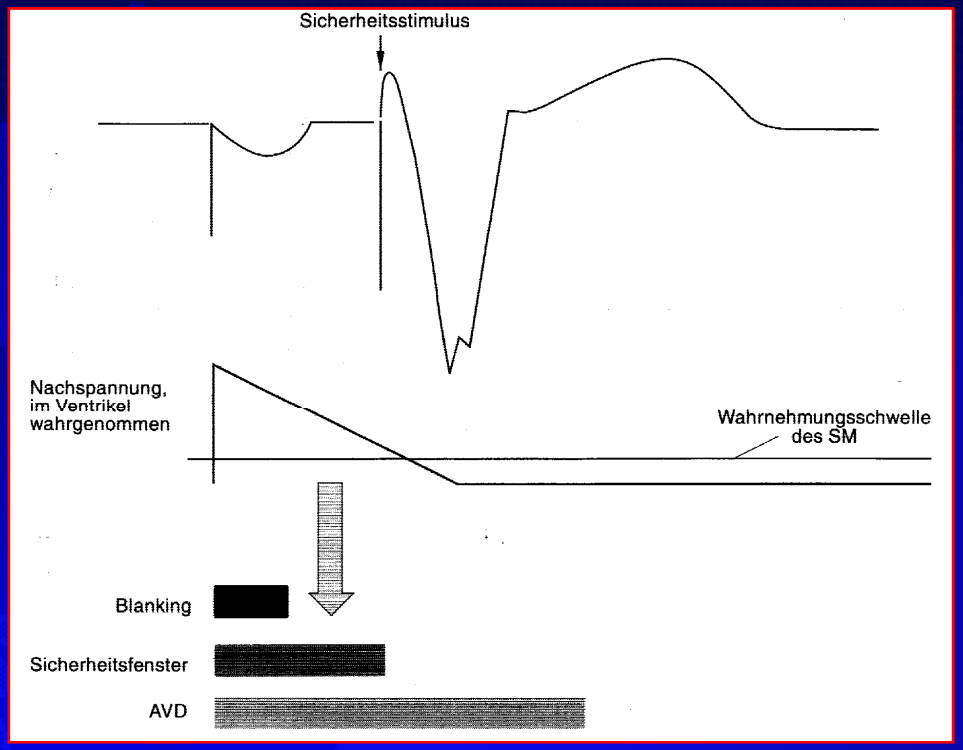


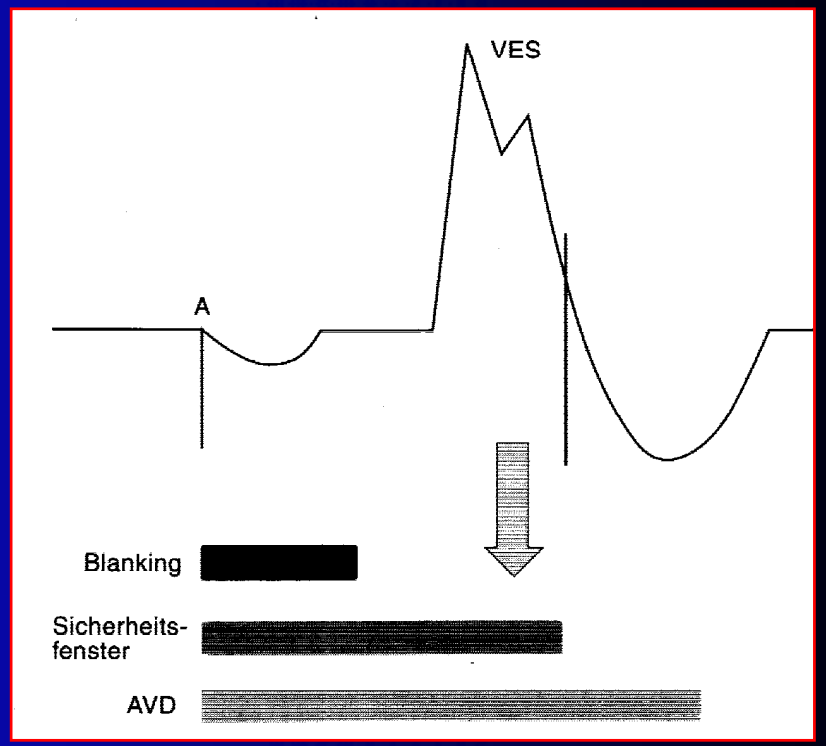
Safety Window Pacing



50 mm/s

Safety Window Pacing (SP)



Appropriate intervention of SP due to cross-talk

False positive intervention due to a PVC