

# High energy shockwave with low energy density - a new concept for ESWL

## First clinical results with the shockwave system SIEMENS U 11 (Pulso®)



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### Objectives

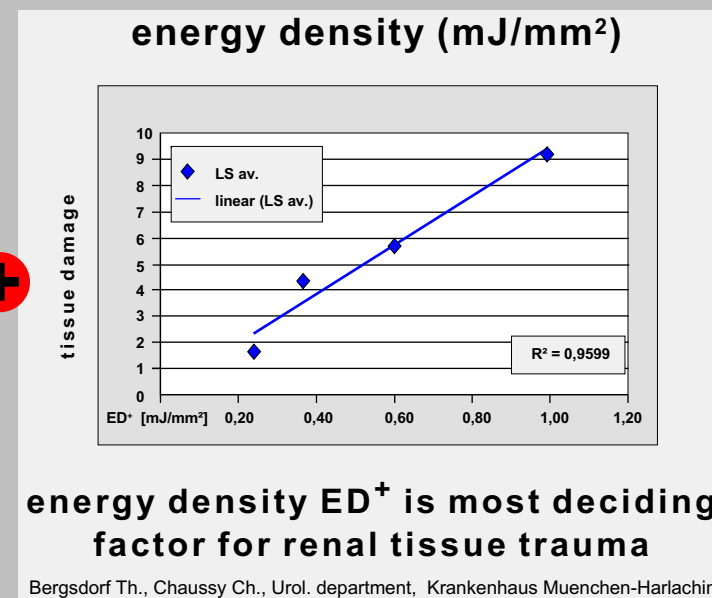
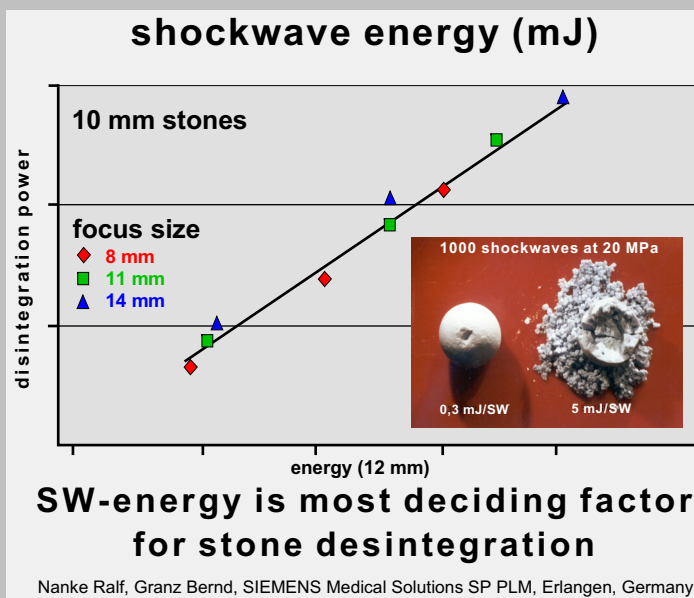
Extracorporeal shockwave lithotripsy (ESWL) as an established treatment option for stone therapy has to react to new requirements:

- increasing competition of endoscopic procedures for stone removal
- changing financial situation of the health system (DRG's)

There is a need for new shockwave systems with high performance (low retreatment rate) and furthermore:

- low potential of tissue traumatization (low rate of side effects)
- anaesthesiafree treatment, only analgesia (outpatient procedure)

### Material and Methods



requirements for new shockwave system

- high energy output (desintegration)
- low energy density (tissue damage)

➔ big focus size

⊞ electromagnetic SW-system  
**SIEMENS U 11 (Pulso®)**

technical data of **SIEMENS U11**

- acoustic lens 158 mm
- aperture 53 °
- penetration depth 16 cm
- focus size Ø 8 - 12 mm
- E+ (12 mm) 4 - 91 mJ

for a first clinical test, the shockwave system U 11 was integrated into the lithotripsy platform

**SIEMENS Modularis Uro Plus**



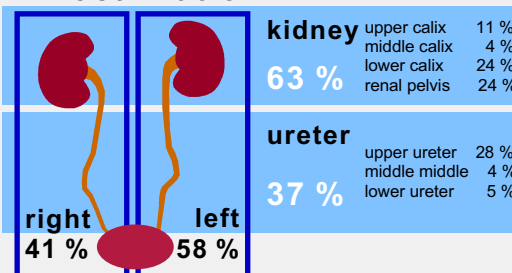
### Results

75 patients between 03 - 08/2004

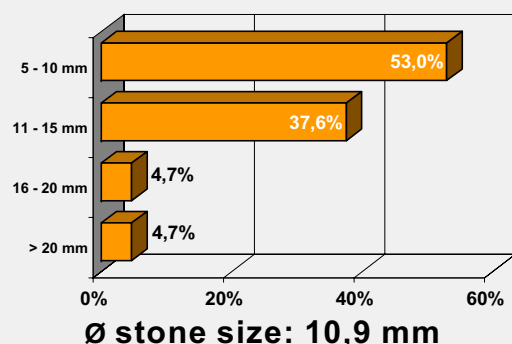
- sex ♂ n = 55 73,3 %  
♀ n = 20 26,7 %
- age ♂ Ø 43,4 years (26 - 74)  
♀ Ø 45,2 years (33 - 89)
- BMI ♂ Ø 27,9 (18,1 - 36,3)  
♀ Ø 26,7 (17,7 - 41,1)

85 radioopaque stones in UTS

• localization



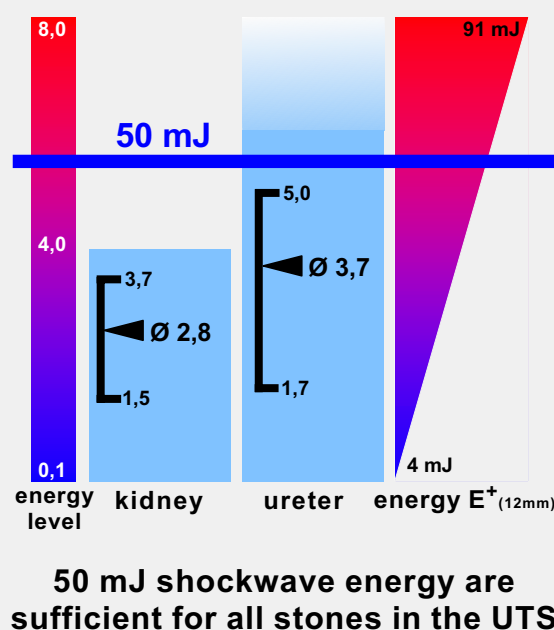
• stone size



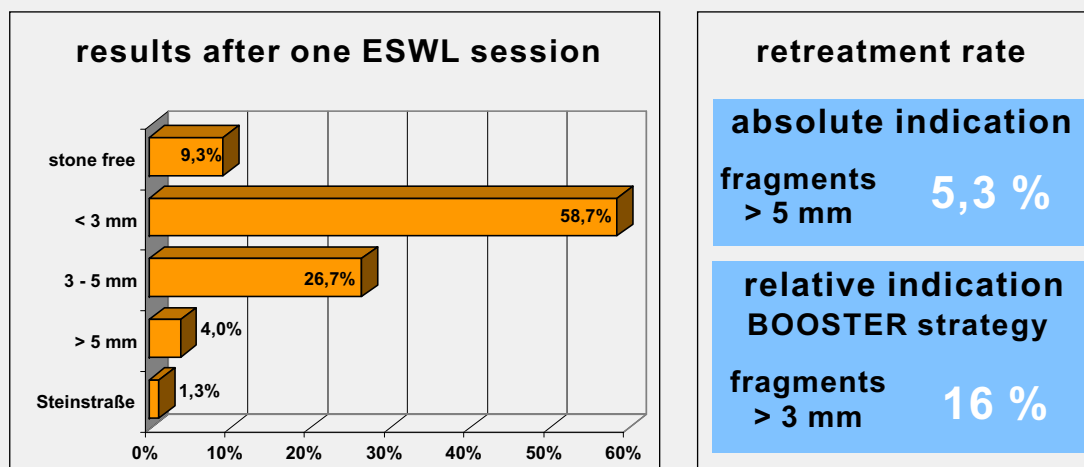
treatment parameters

- treatment time  
kidney Ø 35 min. (18 - 55 minutes)  
ureter Ø 38 min. (23 - 54 minutes)
- shockwave number (90 SW/min.)  
kidney Ø 2.795 (1.500 - 3.500)  
ureter Ø 2.996 (1.800 - 4.000)
- energy level (0,1 - 8,0)  
kidney Ø 2,8 (1,5 - 3,7)  
ureter Ø 3,7 (1,7 - 5,0)

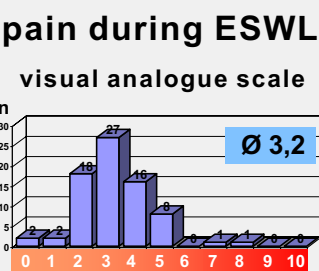
energy level - shockwave energy



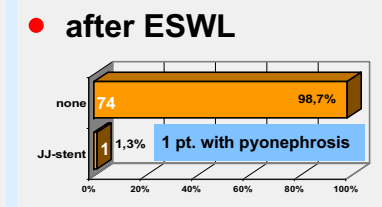
stone desintegration after 24 hours (ultrasound, KUB)



analgesia  
on demand analgesia with i.v. bolus Rapifen® (alfentanil)  
Ø 2,3 mg Rapifen (1,0 - 5,0 mg)



auxiliary procedures



complications

renal colics 4,0 % n=3

infected hydronephrosis 1,3 % n=1

subcapsular renal hematoma 1,3 % n=1  
1 pat. with extreme hypertension during ESWL

### Conclusion

The concept of big focal spot, - high energy with low energy density - realized with

electromagnetic SW-system  
**SIEMENS U 11 (Pulso®)**



achieves

- high performance (low retreatment rate)
- low rate of complications
- treatment with i.v. analgesia