

# Prolonged microbiological incubation of bioptic tissue samples significantly improves the positive identification of the causative bacteria in pyogenic infection

**Spine Centre**

Orthopedic Clinic Markgröningen



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## Review

### positive bacterial culture in spondylitis:

<b>Dimar et al.</b> Spine 2004 :	<b>69%</b>	( 42 pat.	period 11 years)
<b>Lee et al.</b> J Bone Joint Surg (Br) 2006:	<b>50%</b>	( 18 pat.	period 4 years)
<b>Ruf et al.</b> Spine 2007:	<b>53%</b>	( 88 pat.	period 3 years)
<b>Dai et al.</b> Eur Spine J 2008:	<b>45%</b>	( 22 pat.	period 4 years)
<b>Ewald et al.</b> Orthopäde 2009:	<b>79%</b>	( 53 pat.	period 8 years)
<b>Orthopedic Clinic Markgröningen:</b> (smear tests with 2,5 days of incubation)	<b>53%</b>	(165 pat.	period 5 years)

### Leading bacteria in the Review:


• <b>Staphylococcus aureus</b>	<b>39% to 70%</b>	Staphylococcus epidermidis	3% to 6%
• Streptococcus	8% to 19%	TBC	rare to 32%
• E.coli	rare to 23%	Pseudomonas aeruginosa	rare
• Candida albicans	rare		

## Methods:

- **General:** Included are all patients with pyogenic spinal infection, treated in our spine centre 2008 and 2009 (with or without an operation )
- **Operative therapy:** intraoperative 5 tissues samples were collected for microbiological examination, 1 tissue sample for histological examination
- **Conservative therapy:** computerized tomography-guided biopsy of the focus of the inflammation was done. This tissue was collected in a blood culture media (BD BACTEC-PED-PLUS/F Medium)
- **Incubation for 14 days, aerobic and anaerobic, on different agar plates**,  $36\pm 1^{\circ}\text{C}$  (trypticase-soy agar containing 5% sheep blood (Oxoid), chocolate agar (Becton Dickinson), MacConkey II agar (Becton Dickinson), brain-heart infusion broth (Oxoid), Schaedler agar containing vitamin K1 and 5% sheep blood (Becton Dickinson), Schaedler broth (Oxoid))
- **Daily check** of the agar plates
- The culture was **declared negative if no growth** was visible after **14 days**
- At least **2 cultures** must detect the **same** bacterium or micro-organism
- If only **1 culture** detects a micro-organism, the **histological examination** must detect an acute or chronic infection

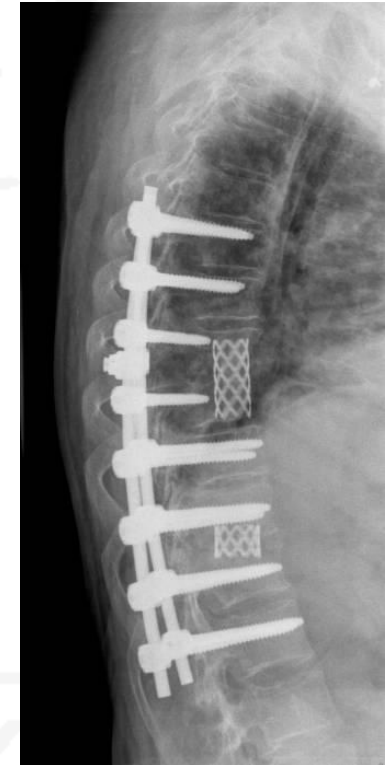
## Results:

Patient group:	n= 82	
Conservative treated group:	n= 6	7,3%
Operative treated group:	n= 76	92,7%

Received antibiotic treatment before admission:	n= 32	39,0%
 Clindamycin	n= 23	71,9%

<b>Histological analysis of an infection:</b>	n=79	94%
• Sanious:	n=65	82,3%
• Chronically infected:	n= 9	11,3%
• Granulomatous	n= 5	6,4%

<b>Positive bacterial culture in microbiological examination:</b>		
Complete group of patients :	n=71	86,6%



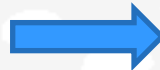
## Results:

### Positive bacterial culture:

Operative treated group (5 tissue samples) 90,79%

Conservative treated group (1 ct-guided biopsy) 33,33%

$p = 0,0044$  (Fisher`s Exact test)



**highly significant**

### Positive bacterial culture:

Not treated with antibiotics before: 89%

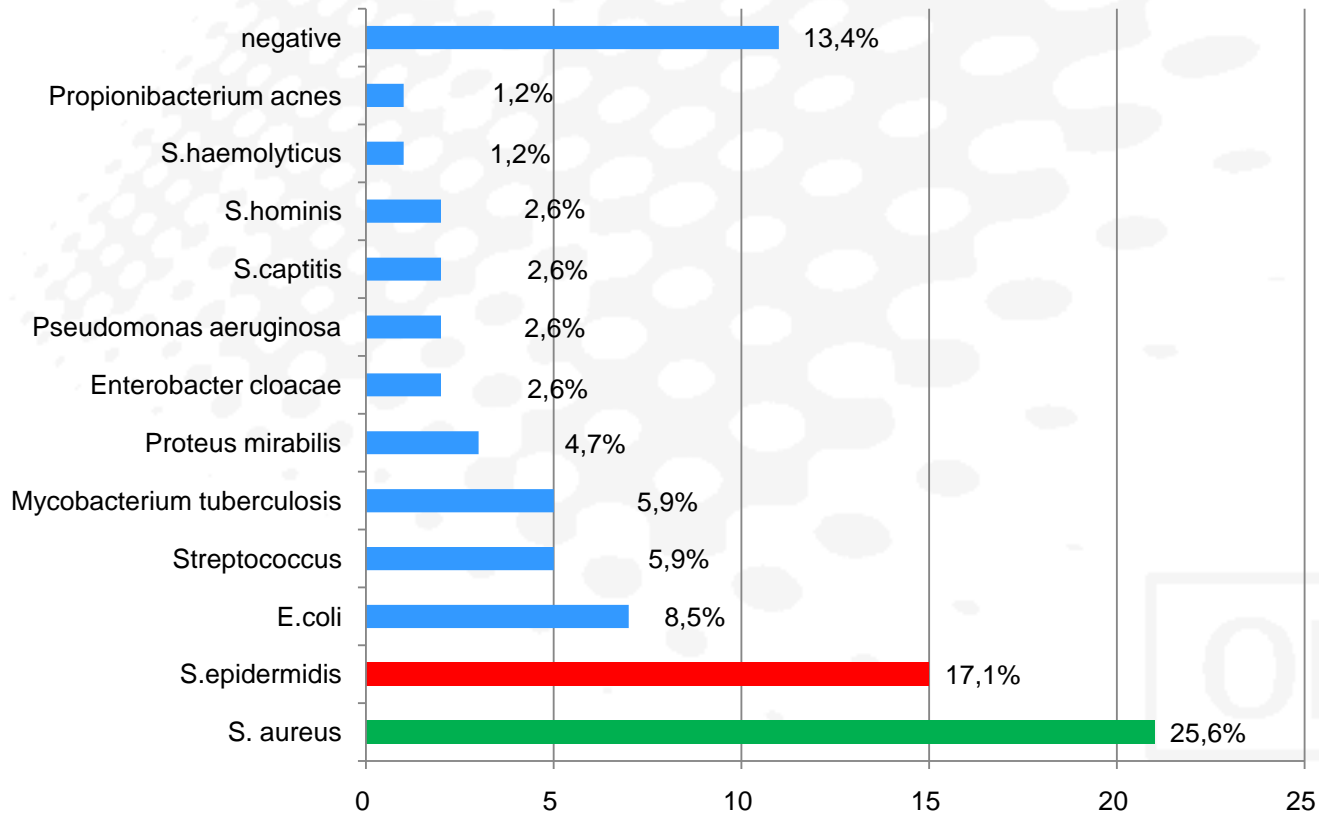
Pre-antibiotic treated group: 57%

$p = 0,022$  (Fisher`s Exact test)



**significant**

# Results: Spectrum of micro-organism



## Results:

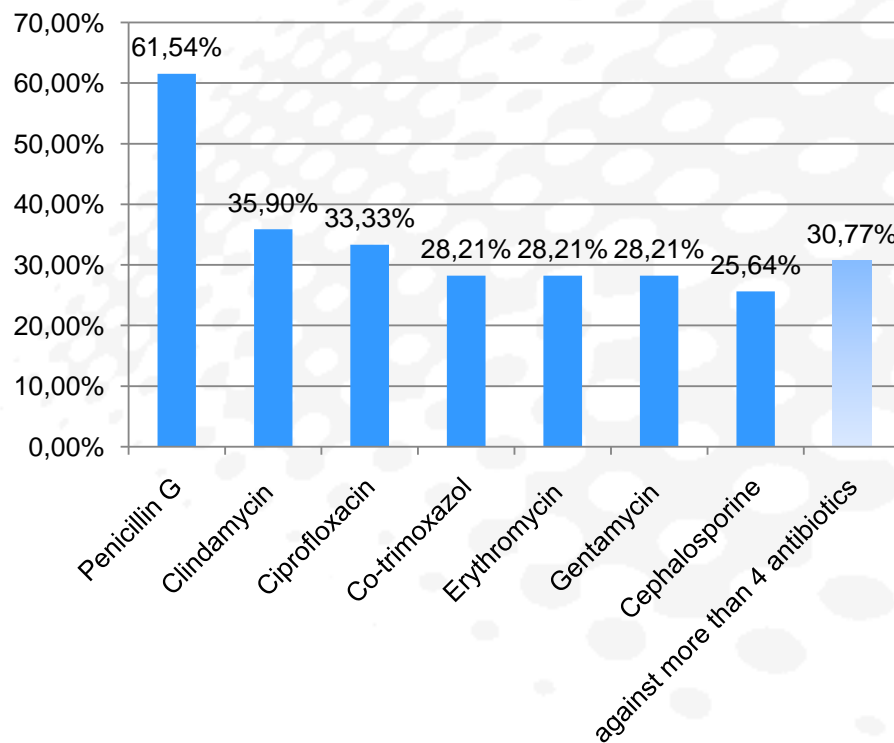
negative detection rate: (n=11)

positive histological examination: ( 100% pos. histological testing)

• granulomatous infection	n=2	<b>18,8%</b>
• chronic infection:	n=2	<b>18.8%</b>
• sanious infection:	n=7	62,4%

**The identification of a positive microbiological detection rate in patients with granulomatous and chronic infection is difficult**

## Results: bacterial resistance



16 patients with a resistance against more than 4 antibiotics:

- S.epidermidis** n=11
- MRSA n= 1
- S.haemolyticus n= 1
- Pseudomonas aeruginosa n= 1
- Enterococcus faecalis n= 1
- Streptococcus sanguis n= 1



## Conclusion:

- Prolonged bacterial culture and more samples can advance the detection rate of micro-organism in pyogenic spinal infection
- S.epidermidis (17,1%) is detected more frequent than in other reports.
- Significant worse detection rate of patients with pre-antibiotic treatment
- Patients with only one ct-guided biopsy show a significant worse detection rate
- Worse detection rate of patients with chronic or granulomatous infection
- 30,8 % of the micro-organism were multi- resistant
- **Aimed antibiotic therapy after evidence of micro-organism according to drug resistance**



Thank you for your attention!

None of the authors has any potential conflict of interest