ORTHO TRAUMA UPDATE **2024**

23. und 24. Februar

Wirbelsäule

René Schmidt, Göppingen

Interessenkonflikte

Vortragstätigkeit: Stryker

Wunddrainage

Molina M et al., Spine J. 2023; 23:473-483

Table 3
Outcomes for drain and nondrain group after surgery for 30 days follow-up

	Drain Group (n=45)	Nondrain Group (n=48)	p value
Postoperative lumbar VAS	3 (1−5)	3 (1−4)	.553
Postoperative lower extremity VAS	1 (0−5)	1 (0−4)	.554
Postoperative ODI	26.7 (16−48.9)	22.2 (15.6−36)	.249
Postoperative SF-36	56.7 (49.1−66)	67.9 (53.6−79.2)	**.043**
Hematocrit			
24 h post-op	34.2 (31.6−39.3)	36 (32−39)	.412
Discharge/4th day postop	34 (29.7−37.6)	36.4 (32−39)	**.054**
Surgery-related outcomes			
Operative time (min)	180 (150−202)	151 (140−210)	.468
Estimated blood loss (mL)	400 (250−500)	350 (200−400)	.170
Length of hospital stay (days)	4 (3−5)	3 (2−4)	**.007**
Post-op peak temperature (°C)	36.7 (36.5−36.9)	36.8 (36.7−37)	.148
Surgical complication	5 (11.1%)	2 (4.5%)	.250

Lumbale Spinalkanalstenose

State of the Art

S2k-Leitlinie

Spezifischer Kreuzschmerz

AWMF Registernummer: 033-051

Stand vom Dezember 2017

Neue Leitlinie über AWMF in Arbeit S2k über die DGOU, Sektion Wirbelsäule!

Epidemiologie

Kalichman L et al., Spine J. 2009; 9(7):545-50

5/100.000 Einwohner

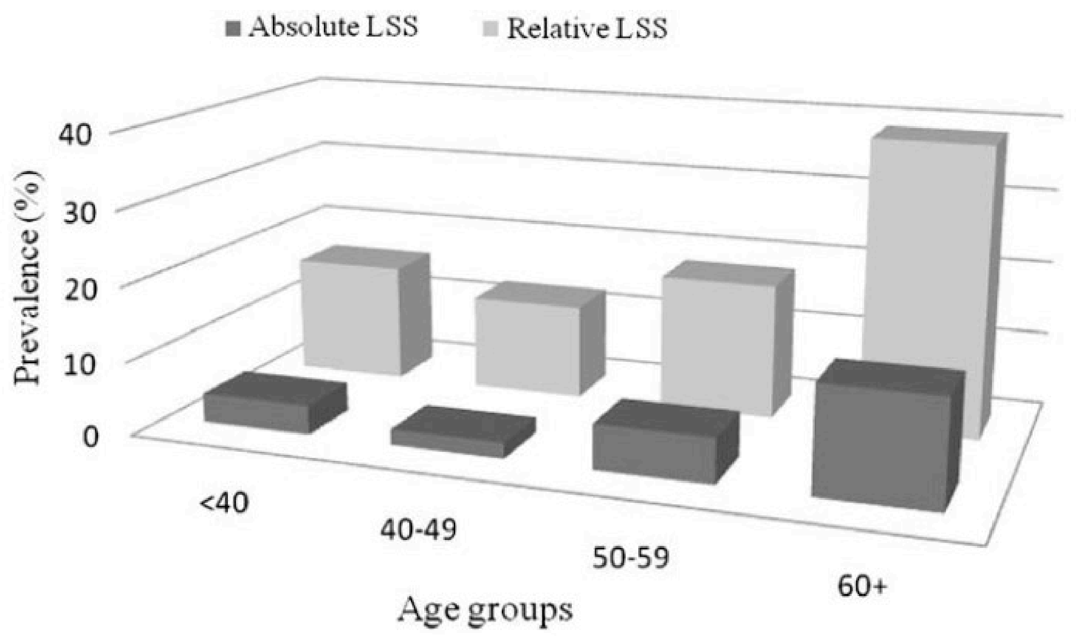
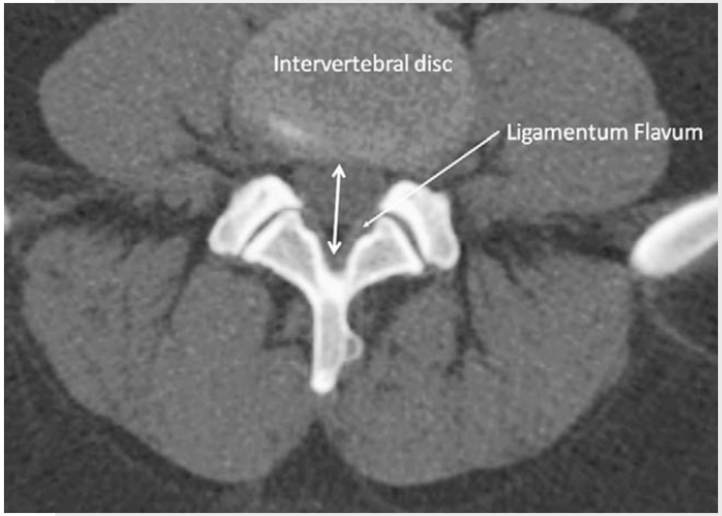


Fig. 2. Prevalence of individuals with acquired lumbar spinal stenosis (%) according to the age groups.



Radiologische Diagnose

Yang J et al., BMC Musculoskelet Disord. 2023; 24(1):225

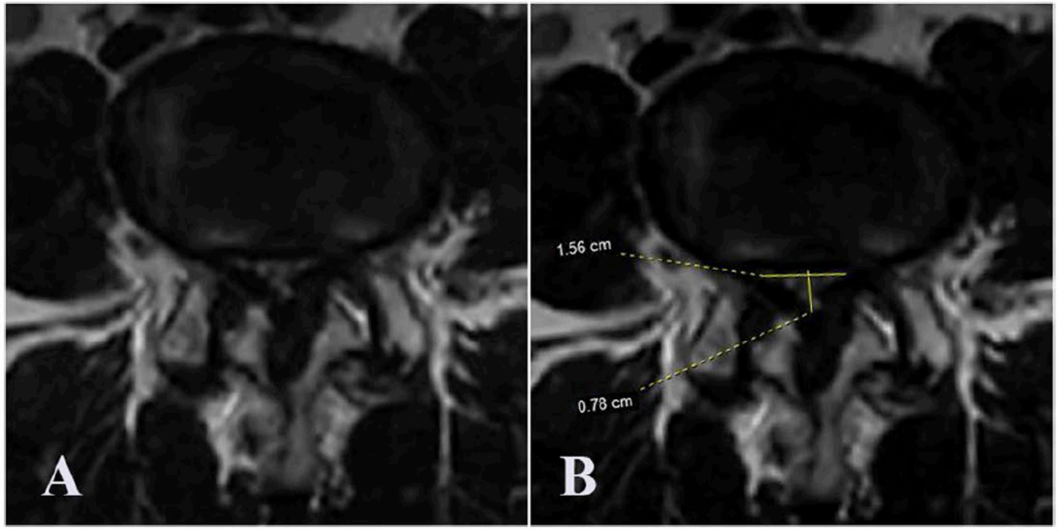
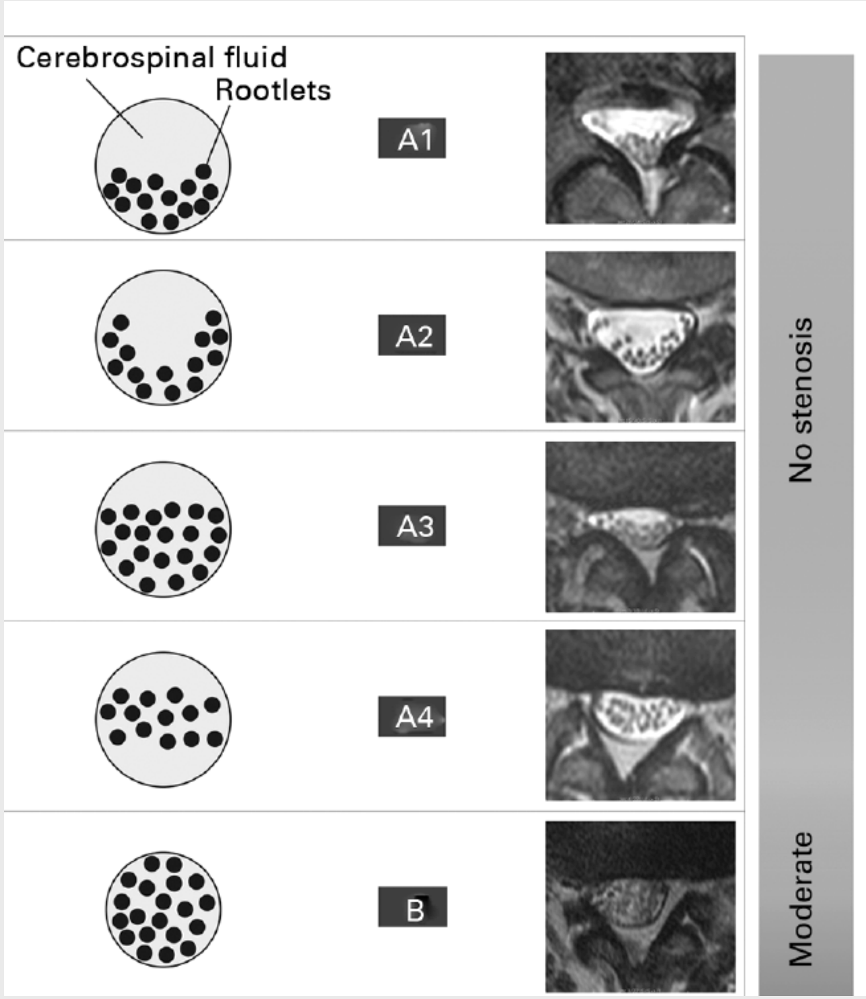


Fig. 2 The image of the most stenotic layer of a 64-year-old man with L4–5 spinal stenosis. **A** the image is evaluated as morphological grade D and nerve root sedimentation sign (P [−]); **B** the anterior–posterior and transverse diameter of the dural sac are 7.8 and 15.6 mm, respectively, and the dural sac cross-sectional area is 60.8 mm^2 based on the calculation method of Hamanishi et al. [4]

Morphologische Diagnose

Schizas C, Kulik G., J Bone Joint Surg Br. 2012; 94(1):98-101



Vergleich radiologische Diagnose

Yang J et al., BMC Musculoskelet Disord. 2023; 24(1):225

Table 3 The correlations between Dural Cross Sectional Area, Morphological Grade and Nerve Root Sedimentation Sign

	r	*P*
Dural Cross Sectional Area versus		
Morphological Grade	-0.86	< 0.01
Nerve Root Sedimentation Sign	-0.78	< 0.01
Morphological Grade versus		
Nerve Root Sedimentation Sign	-0.58	< 0.01

Vergleich radiologische Diagnose

Yang J et al., BMC Musculoskelet Disord. 2023; 24(1):225

Table 4 The correlations between severity of stenosis and pre-operative clinical parameters

	r	*P*
Dural Cross Sectional Area versus		
VAS of Leg Pain	-0.14	0.04
VAS of Low Back Pain	-0.01	0.91
ODI	-0.17	0.02
Claudication	-0.19	0.01
Morphological Grade versus		
VAS of Leg Pain	0.19	0.01
VAS of Low Back Pain	-0.09	0.20
ODI	0.09	0.20
Claudication	0.27	< 0.01
Nerve Root Sedimentation Sign versus		
VAS of Leg Pain	0.08	0.28
VAS of Low Back Pain	0.07	0.31
ODI	0.23	< 0.01
Claudication	0.02	0.83

VAS Visual Analog Scale, *ODI* Oswestry Disability Index

Table 5 The correlations between severity of stenosis and post-operative clinical parameters

	r	*P*
Dural Sac Cross Sectional Area versus		
VAS of Leg Pain	-0.14	0.06
VAS of Low Back Pain	-0.06	0.44
ODI	-0.06	0.40
Claudication	-0.01	0.89
Morphological Grade versus		
VAS of Leg Pain	-0.14	0.04
VAS of Low Back Pain	-0.03	0.71
ODI	0.02	0.74
Claudication	0.01	0.91
Nerve Root Sedimentation Sign versus		
VAS of Leg Pain	0.07	0.30
VAS of Low Back Pain	0.09	0.23
ODI	0.17	0.02
Claudication	-0.11	0.14

VAS Visual Analog Scale, *ODI* Oswestry Disability Index

Bildgebung/Klinik

Ishimoto Y et al., Osteoarthritis Cartilage. 2013; 21(6):783-8

Table III
The association of radiographic LSS with clinical symptoms

	None/Mild	Moderate	Severe	Total
Men				
Radiographic LSS*	66	144	98	308
Clinical symptoms	4 (6.1)	12 (8.3)	19 (19.4)	35 (11.4)
Women				
Radiographic LSS*	141	302	187	630
Clinical symptoms	7 (5.0)	32 (10.6)	31 (16.6)	70 (11.1)
Total				
Radiographic LSS*	207	446	285	938
Clinical symptoms	11 (5.3)	44 (9.9)	50 (17.5)	105 (11.2)

Number (%).

* Radiographic LSS means central stenosis.

Klinische Diagnose

Tomkins-Lane C et al., Spine (Phila Pa 1976). 2016; 41(15):1239-1246

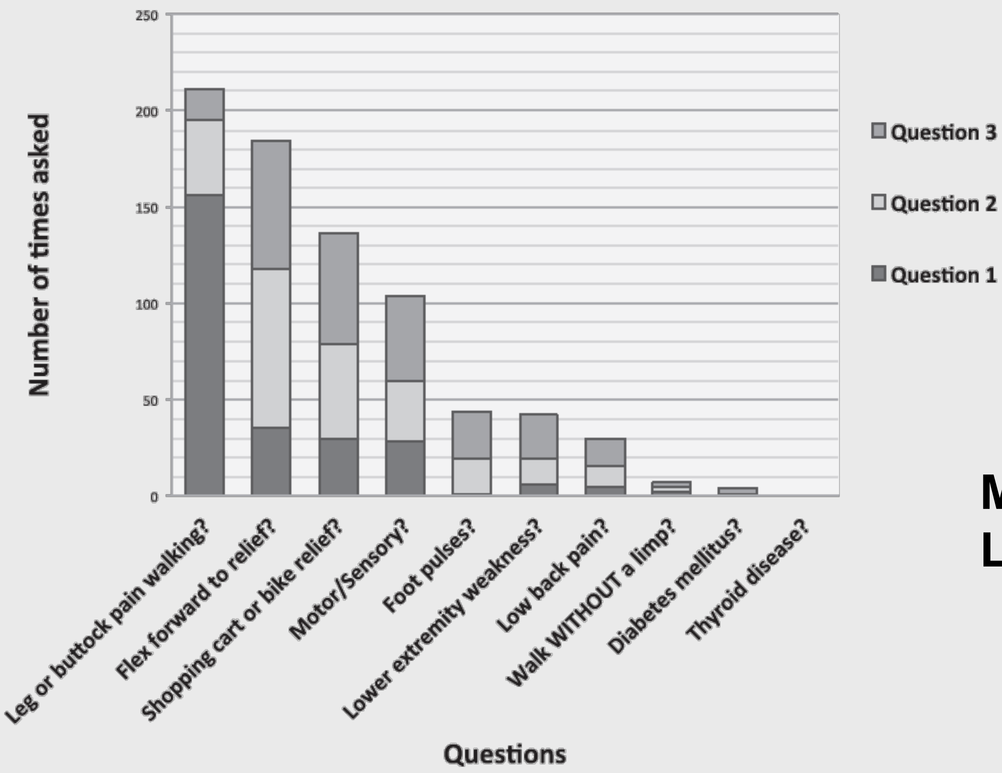


Figure 2. Number of times questions were selected and order of question selection in Phase 2, Round 3: International Survey.

Mit nur sechs Fragen kann eine LSS zu 80% diagnostiziert werden.

Klinische Diagnose

Tomkins-Lane C et al., Spine (Phila Pa 1976). 2016; 41(15):1239-1246

Anamnestisch/klinische Parameter (in absteigender Relevanz)
Bein- oder Gesässschmerzen bei Laufen?
Besserung der Beschwerden beim Vornüberbeugen?
Besserung der Beschwerden beim Fahrradahren, mit Einkaufswagen?
Kommt es zu motorischen und sensiblen Störungen beim Laufen?
Fusspulse vorhanden, symmetrisch?
«Weiche» / schwache Beine?
Bestehen Rückenschmerzen?

Therapie

Empfehlung 2.12:

Trotz der relativ geringen Evidenz eines Langzeiterfolges sowohl für medikamentöse Therapie, Physiotherapie, Orthesen und Injektionen sollte ein konservativer Therapieversuch bei fehlendem neurologischem Defizit oder immobilisierender Schmerzen unter begleitender Erfolgskontrolle zunächst versucht werden.

100% Zustimmung (starker Konsens)

S2k-Leitlinie

Spezifischer Kreuzschmerz

Gabapentin und Pregabalin bei lumbaler Spinalkanalstenose (LSS)

Martinez T et al., Front Pharmacol 2023;14:1249478

TABLE 2 Treatment regimen applied to patients in each included study.

Study	Treatment schemes	
	Control	Experimental
Kim et al. (2016)	Limaprost (5 µg 3/d)	Pregabalin (75 mg 3/d)
Onda and Kimura (2018)	Limaprost (5 µg 3/d) + NSAID (standard)	Pregabalin (1ª sem. 25 mg 2/d, 2ª sem. 75 mg 2/d) + NSAID (standard)
Markman et al. (2015)	1. Dphenhydramine: 6.25 mg 2/d, 3 d - 12.5md 2/d, 7 d - 6.25 mg 2/d, 3 d Cleaning 7 d 2. Pregbalin: 75 mg 2/d. 3 días - 150 mg 2/d 7 d - 75 mg 2/d 3 d •	1. Pregbalin: 75 mg 2/d 3 días - 150 mg 2/d, 7d - 75 mg 2/d 3 d Cleaning 7 d 2. Diphenhydramine: 6.25 mg 2/d, 3 d - 12.5md 2/d, 7 d - 6.25 mg 2/d, 3 d
Takahashi et al. (2014)	NSAID (standard)	NSAID 2 s - NSAID + Pregabalin 25–50 mg/d 1 s - If not effective increase Pregabalin to 150 mg/d 1 s - If not effective increase Pregabalin to 300 mg/d.
Yaksi et al. (2007)	Conservative procedures + NSAID (standard)	Conservative procedures + NSAID + Gabapentin 900 mg/d. increasing 300 mg/week until 2400 mg/d
Haddadi et al. (2016)	Placebo	Gabapentin 300 md 3/d, 8 s Cleaning 4 s

Gabapentin und Pregabalin bei lumbaler Spinalkanalstenose (LSS)

Martinez T et al., Front Pharmacol 2023;14:1249478

	Pregabalina		Control			Odds Ratio
Study or Subgroup	Events	Total	Events	Total	Weight	M-H, Fixed, 95% CI
Haddadi et al. 2016	3	30	0	30	24.1%	7.76 [0.38, 157.14]
Onda et al. 2018	2	23	0	23	24.4%	5.47 [0.25, 120.37]
Takahashi et al. 2014	2	64	0	60	27.0%	4.84 [0.23, 102.90]
Yaksi et al. 2007	2	28	0	29	24.5%	5.57 [0.26, 121.27]
Total (95% CI)		**145**		**142**	**100.0%**	**5.88 [1.28, 27.05]**
Total events	9		0			

Heterogeneity: Chi² = 0.05, df = 3 (P = 1.00); I² = 0%
Test for overall effect: Z = 2.27 (P = 0.02)

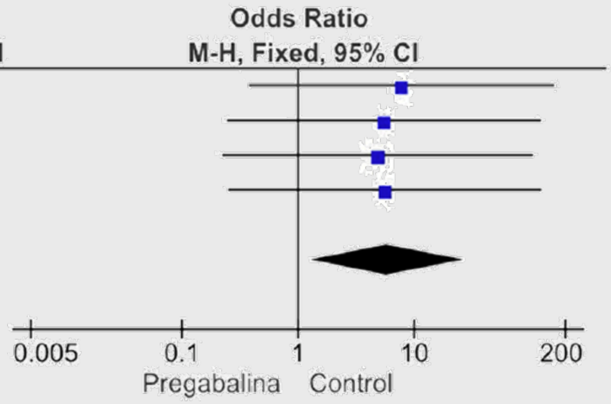


FIGURE 5
Forest plot showing the odds ratio of adverse events in the pregabalin/gabapentin-treated group compared to the control group in four studies.

Therapie

Empfehlung 2.13:
Die operative Dekompression sollte erwogen werden, wenn konservative Maßnahmen nicht ausreichen, um eine für den individuellen Patienten zufriedenstellende Lebensqualität zu erzielen.

100 % Zustimmung (starker Konsens)

S2k-Leitlinie

Spezifischer Kreuzschmerz

Schwankungsverhalten von Patienten mit lumbaler Spinalkanalstenose

Ujigo S et al., Eur Spine J 2023;32:4174-4183

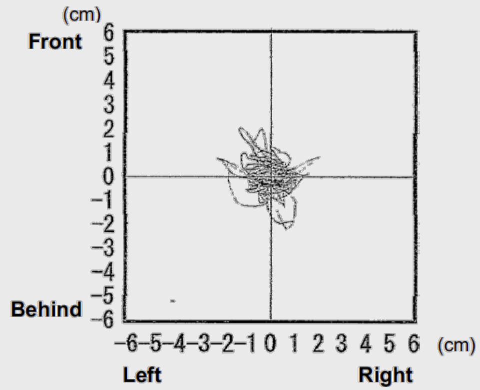


Table 2 Comparison of pre- and post-operative outcomes

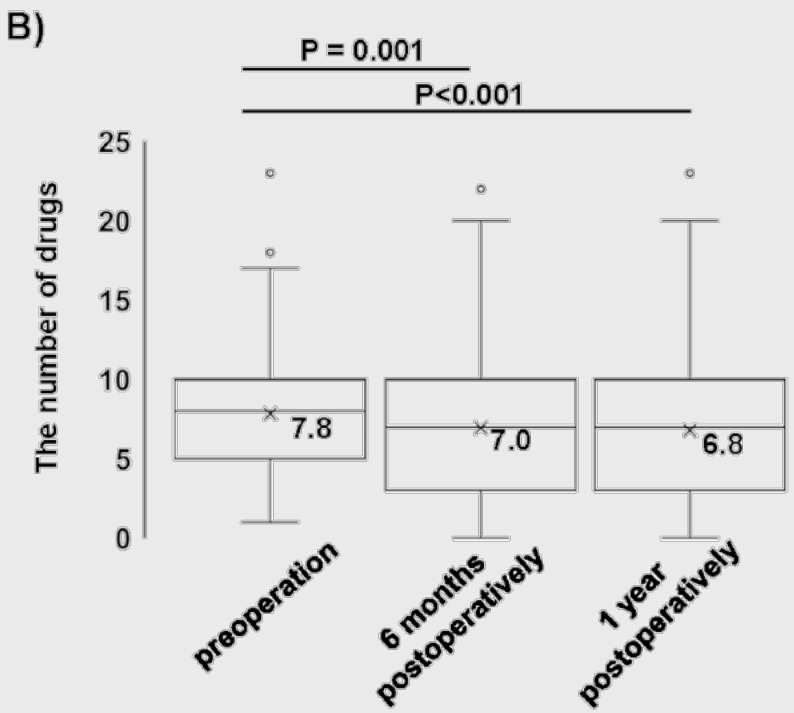
		All cases	*p* value	Moderate group	*p* value	Severe group	*p* value
VAS (mm)	Before	66.5 ± 23.9	< 0.001	64.4 ± 25.9	< 0.001	68.0 ± 22.7	< 0.001
	After	21.0 ± 25.6		21.9 ± 25.7		20.3 ± 25.9	
ODI (%)	Before	41.9 ± 15.0	< 0.001	45.3 ± 14.9	< 0.001	39.4 ± 14.9	< 0.001
	After	21.9 ± 15.7		21.1 ± 13.9		22.4 ± 17.1	
EA (cm^2)	Before	7.8 ± 6.7	0.004	4.3 ± 1.8	0.851	10.4 ± 7.8	< 0.001
	After	5.8 ± 5.3		4.3 ± 2.6		7.0 ± 6.4	
L/EA (cm/cm^2)	Before	19.1 ± 6.3	0.228	21.3 ± 4.8	0.906	17.6 ± 6.9	0.088
	After	20.6 ± 7.5		21.5 ± 7.2		19.9 ± 7.9	

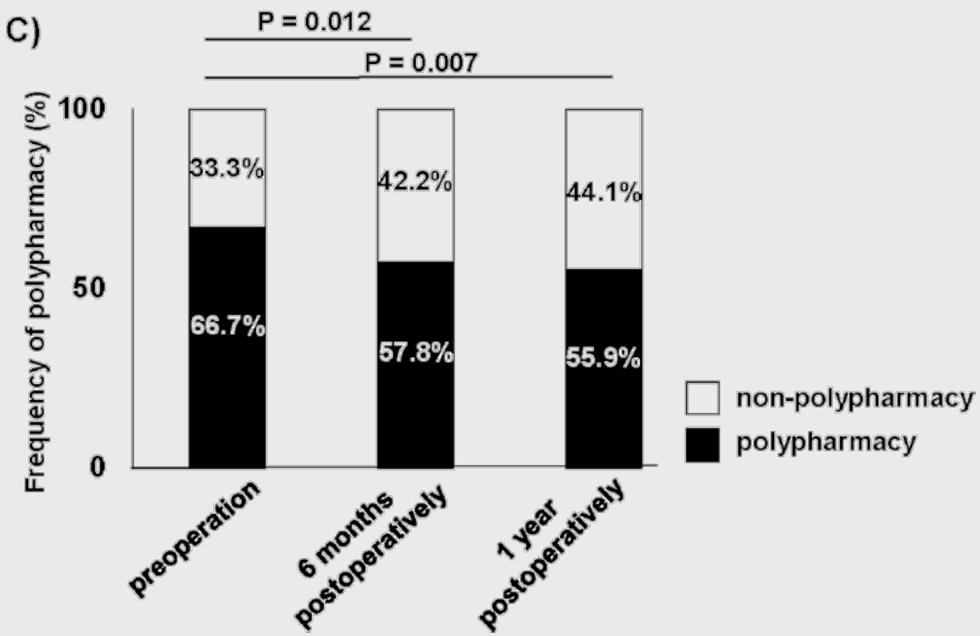
VAS visual analog scale, *ODI* Oswestry Disability Index, *EA* environmental area, *L/EA* locus length per environmental area

*Significant difference

Polypharmazie bei Patienten mit lumbaler Spinalkanalstenose

Nagai S et al., BMC Geriatr 2023;23:169





Polypharmazie bei Patienten mit lumbaler Spinalkanalstenose

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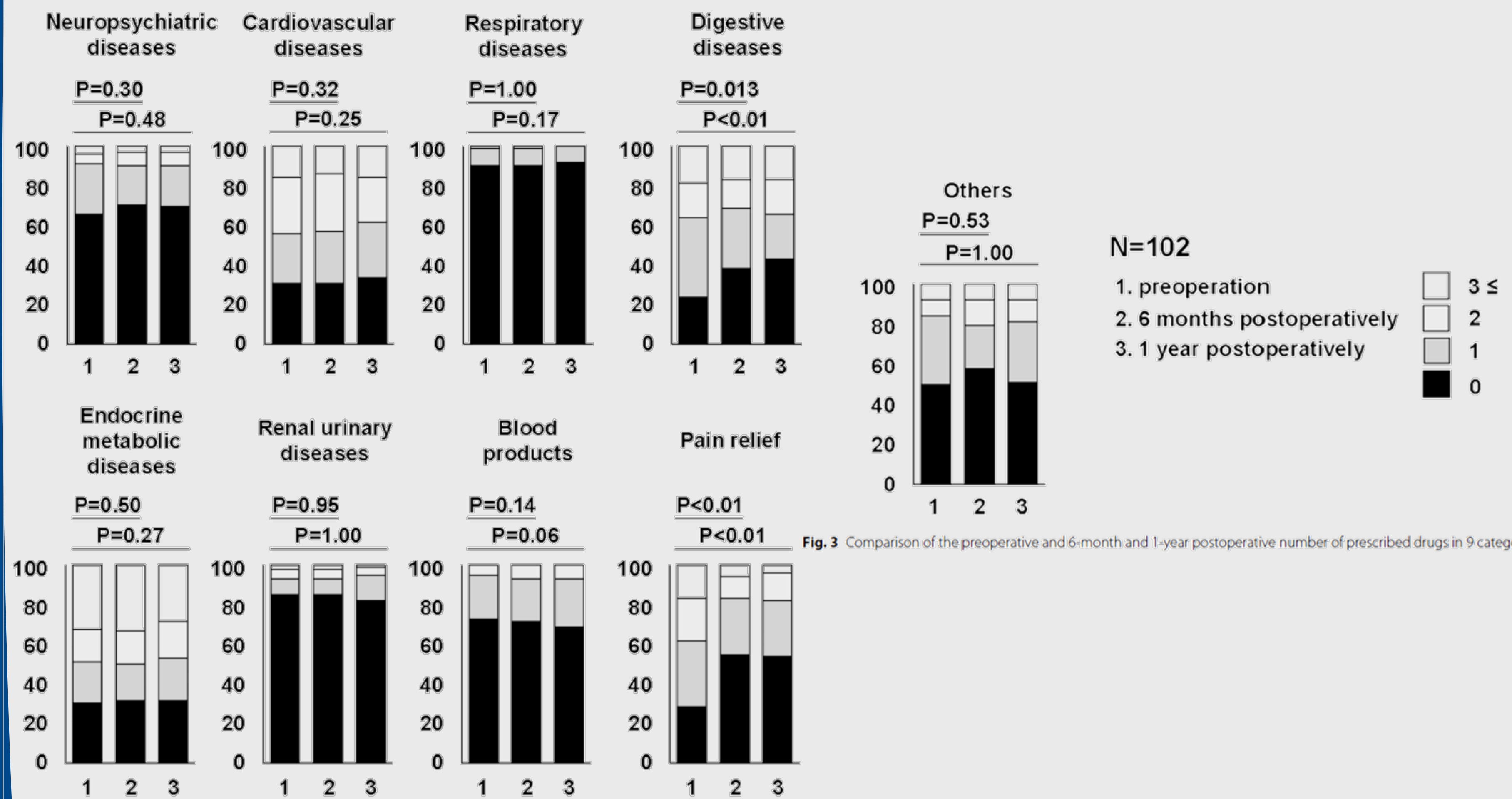


Fig. 3 Comparison of the preoperative and 6-month and 1-year postoperative number of prescribed drugs in 9 categories

Ist der postoperative Duraquerschnitt als Ausmaß der Dekompression bei LSS ausschlaggebend für das Outcome?

Hermansen E et al., Spine (Phila Pa 1976) 2023;48:688-694

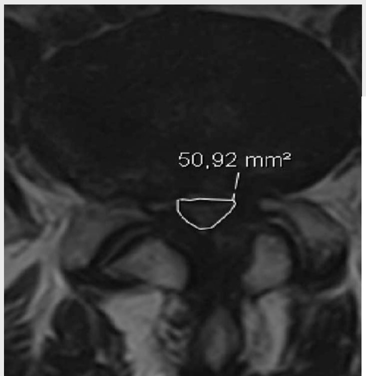


TABLE 2. Patient-reported outcome measures related to postoperative dural sac cross-section area (DSCA) in mm^2 for LSS patients operated with decompressive surgery

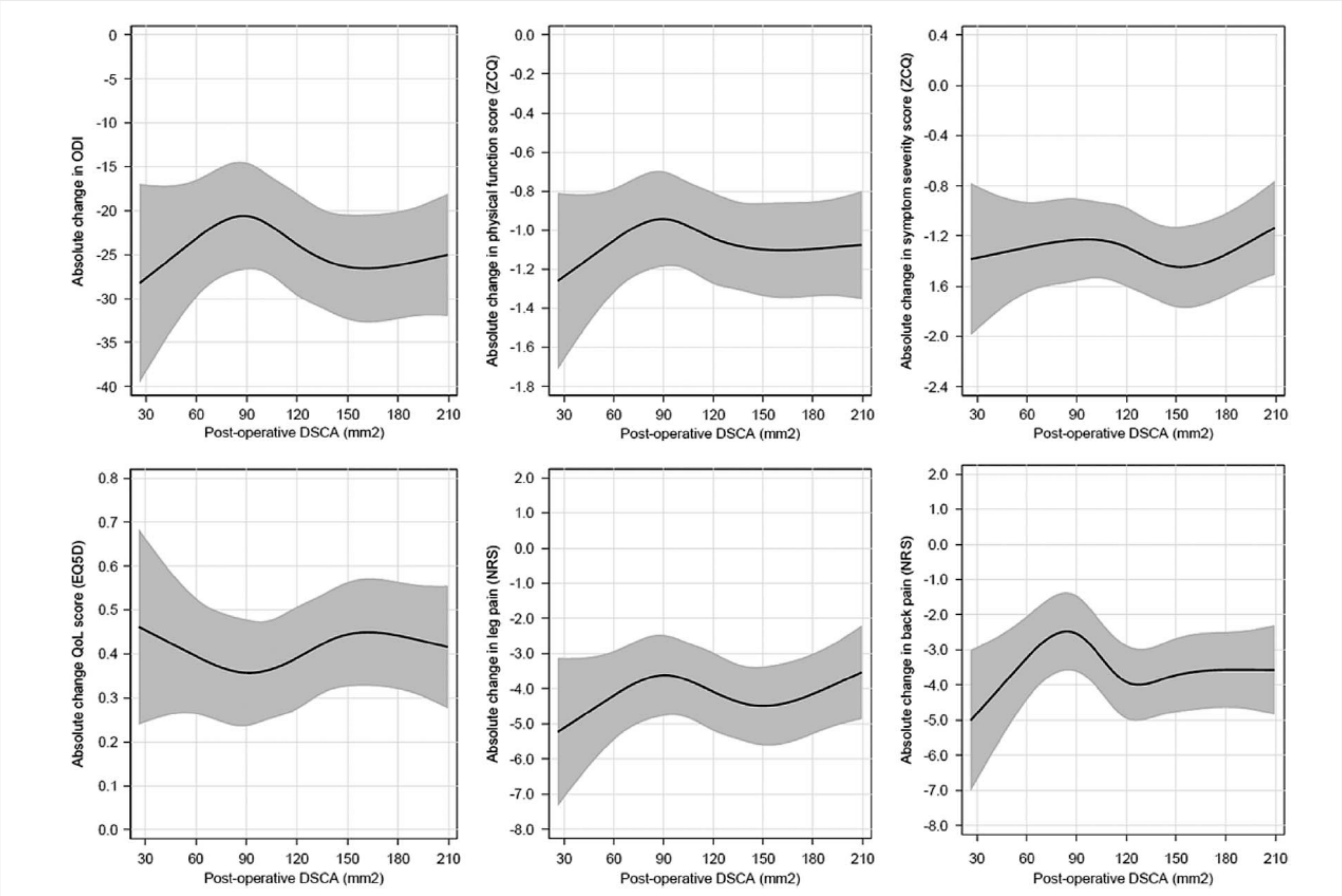
	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5
Postoperative DSCA (range, mm^2)	185 (155–276)	141 (127–154)	118 (108–126)	96 (83–108)	64 (26–82)
Change ODI	−22.0 (−25.6, −18.4)	−21.1 (−24.5, −17.8)	−19.4 (−22.9, −15.9)	−15.9 (−19.3, −12.6)	−18.9 (−22.4, −15.3)
Change physical function (ZCQ)	−1.0 (−1.1, −0.8)	−0.8 (−0.9, −0.6)	−0.9 (−1.0, −0.7)	−0.8 (−0.9, −0.6)	−0.8 (−1.0, −0.7)
Change symptoms (ZCQ)	−1.1 (−1.3, −0.9)	−1.0 (−1.2, −0.8)	−1.1 (−1.3, −0.9)	−0.9 (−1.1, −0.7)	−1.0 (−1.2, −0.8)
Change QoL (EQ5D)	0.4 (0.3, 0.5)	0.3 (0.3, 0.4)	0.3 (0.2, 0.4)	0.3 (0.2, 0.4)	0.3 (0.2, 0.4)
Leg pain (NRS)	−3.9 (−4.6, −3.2)	−3.4 (−4.1, −2.8)	−3.6 (−4.3, −3.0)	−3.0 (−3.6, −2.3)	−3.6 (−4.3, −3.0)
Back pain (NRS)	−3.1 (−3.7, −2.4)	−2.8 (−3.4, −2.2)	−3.1 (−3.7, −2.5)	−2.0 (−2.6, −1.4)	−2.4 (−3.0, −1.7)

Based on the postoperative DSCA, the cohort was divided into quintiles. Quintile 1 has the largest postoperative DSCA, and quintile 5 has the smallest postoperative DSCA. Change of the different outcome parameters for each quintile of postoperative DSCA (SD in brackets).

DSCA indicates dural sac cross-sectional area; EQ-5D, EuroQol Questionnaires; LSS, lumbar spinal stenosis; NRS, numeric rating scale; ODI, Oswestry disability index; QoL, quality of life; ZCS, Zurich Claudication Scale.

Ist der postoperative Duraquerschnitt als Ausmaß der Dekompression bei LSS ausschlaggebend für das Outcome?

Hermansen E et al., Spine (Phila Pa 1976) 2023;48:688-694



Sollten Patienten mit Spondylolisthese Grad I und LSS unterschiedlich behandelt werden anhand der Spinopelvinen Balance?

Mohanty S et al., Spine J. 2023; 23:92-104

Table 3
Patient-reported and clinical outcomes among patients with PILL mismatch<10°, stratified by matching approach and procedure type.

	Unmatched cohort			Propensity ccore matched [PSM]			Coarsened exact matched [CEM]		
	Lumbar decompression and fusion [N=149]	Lumbar decompression [N=178]	P value	Lumbar decompression and fusion [N=102]	Lumbar decompression [N=102]	P value	Lumbar decompression and fusion [N=95]	Lumbar decompression [N=95]	P value
Post-Operative Outcomes									
5-7 Months Post-Op, PROs									
PROMIS GMH	20.1 [17.19 - 23.01]	17.38 [15.7 - 19.07]	0.165	19.36 [16.1 - 22.62]	17.38 [15.35 - 19.4]	0.062	19.21 [15.93 - 22.49]	17.69 [15.26 - 20.1]	0.263
PROMIS GPH	19.01 [16.18 - 21.84]	16.65 [14.83 - 18.46]	0.534	17.77 [14.76 - 20.78]	16.3 [14.2 - 18.4]	0.296	18.26 [15.07 - 21.45]	16.98 [14.38 - 19.6]	0.87
10-12 Months Post-Op, PROs									
Presenting PROMIS GMH	19.46 [17.23 - 21.69]	21.65 [20.15 - 23.15]	**<0.0001**	18.67 [16.24 - 21.11]	21.52 [20.0 - 23.03]	**<0.0001**	18.47 [16.11 - 20.83]	21.73 [19.76 - 23.7]	**<0.0001**
Presenting PROMIS GPH	17.42 [15.68 - 19.16]	20.62 [19.44 - 21.8]	**<0.0001**	16.08 [14.63 - 17.54]	20.74 [19.3 - 22.18]	**<0.0001**	16.24 [14.78 - 17.7]	20.61 [18.98 - 22.2]	**<0.0001**

Table 4
Patient-reported and clinical outcomes among patients with PILL mismatch > 10°, stratified by matching approach and procedure type

	Unmatched cohort			Propensity score matched [PSM]			Coarsened exact matched [CEM]		
	Lumbar decompression and fusion [N=190]	Lumbar decompression [N=162]	P value	Lumbar decompression and fusion [N=128]	Lumbar decompression [N=128]	P value	Lumbar decompression and fusion [N=117]	Lumbar decompression [N=117]	P value
Post-Operative Outcomes									
5-7 Months Post-Op, PROs									
PROMIS GMH	17.06 [16.19 - 17.94]	15.1 [14.39 - 15.81]	**0.008**	17.61 [16.61 - 18.6]	14.48 [13.69 - 15.27]	**<0.0001**	17.57 [16.5 - 18.63]	14.7 [13.85 - 15.55]	**<0.0001**
PROMIS GPH	15.63 [14.74 - 16.51]	14.63 [13.82 - 15.44]	0.2354	16.24 [15.17 - 17.3]	14.21 [13.3 - 15.11]	**0.007**	16.13 [15.03 - 17.2]	14.4 [13.43 - 15.36]	**0.012**
10-12 Months Post-Op, PROs									
Presenting PROMIS GMH	24.8 [22.89 - 26.71]	20.56 [18.58 - 22.54]	**<0.0001**	26.61 [24.28 - 28.94]	20.75 [18.4 - 23.1]	**<0.0001**	27.24 [24.78 - 29.7]	20.88 [18.44 - 23.3]	**<0.0001**
Presenting PROMIS GPH	22.44 [21.15 - 23.72]	18.12 [17.06 - 19.18]	**<0.0001**	23.61 [22 - 25.23]	18.13 [16.9 - 19.36]	**<0.0001**	24.05 [22.39 - 25.7]	18.4 [17.05 - 19.74]	**<0.0001**

Instrumentierte oder uninstrumentierte Fusion postero-laterale bei degenerativer Spondylolisthese und LSS

Andresen AK et al., J Bone Joint Surg Am 2023;105:1309-1317

TABLE IV Fusion Rates, Reoperations, and Perioperative Surgical Data

	Instrumented (N = 54)	Uninstrumented (N = 53)	P Value
Fusion at 1 year*	50/53 (94.3%)	16/51 (31.4%)	<0.001
Reoperations at 2 years*	1/54 (1.9%)	7/53 (13.2%)	0.031
Vertebroplasty	1/54 (1.9%)	0/53 (0%)	0.999
Hematoma evacuation	0/54 (0%)	2/53 (3.8%)	0.243
Repeat decompression and fusion	0/54 (0%)	5/53 (9.4%)	0.027
Length of hospital stay† *(days)*	5.7 (5.2-6.1)	6.3 (5.7-7.0)	0.098
Operative time† *(min)*	123.4 (116.4-130.3)	88.8 (82.3-95.2)	<0.001
Blood loss†‡ *(g)*	373.5 (326.8-420.1)	244.5 (209.4-279.7)	<0.001
Drain output†§ *(g)*	220.8 (186.4-255.3)	167.5 (136.3-198.8)	0.024
Weight of autograft†# *(g)*	6.5 (6.0-7.1)	5.3 (4.7-6.0)	0.010

*The values are given as the number/total number (%). †The values are given as the mean (95% confidence interval). ‡The suction bag and surgical napkins were weighed at the end of the surgery. §Upon drain removal, the drain bag was weighed in the inpatient ward. #Decompressed bone was weighed in the operating room; allogenic bone was added to total of 30 g.

Fazit für Klinik und Praxis

- Gabapentinoide funktionieren, aber…
- Mögliche operative Indikation, Fallneigung und Polypharmazie (v. a. Analgetika)
- Revision bei vermeintlicher Reststenose überdenken
- Indikationen für additive Fusion festlegen
- wenn Fusion, dann instrumentiert

Spondylodiszitis

State of the Art

Diagnostik und Therapie der Spondylodiszitis – S2k-Leitlinie

AWMF-Registernummer: 151-001

Stand: 26. August 2020

Was machen Chirurgen?

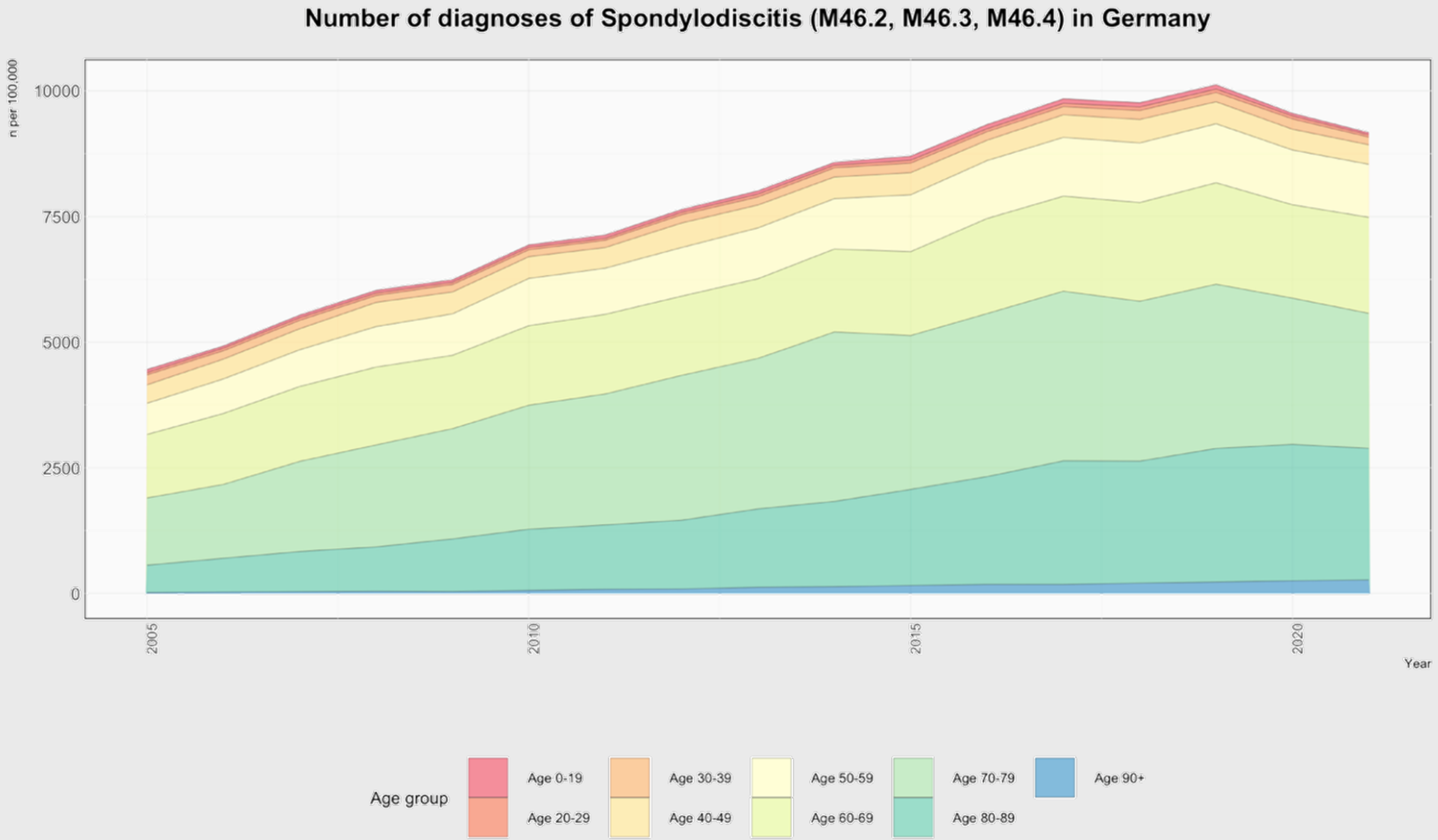
Lawson A et al. World Neurosurgery. 2023; 173:e663-e668

RESULTS: Seventy-nine survey responses were included in the analysis. Magnetic resonance imaging is the diagnostic imaging modality of choice for 87% of respondents; 100% routinely measure C-reactive protein in suspected LPS and 70% routinely take blood cultures before therapy initiation; 41% believe that surgical biopsy to obtain microbiological diagnosis should be carried out in all cases of suspected LPS, whereas 23% believe that surgical biopsy should only be carried out when empirical anti-

Empfehlung 18	**2020**
Ein Erregernachweis soll angestrebt werden. Dieser soll vor Beginn der Antibiotikatherapie erfolgen.	
	100% Zustimmung (starker Konsens)

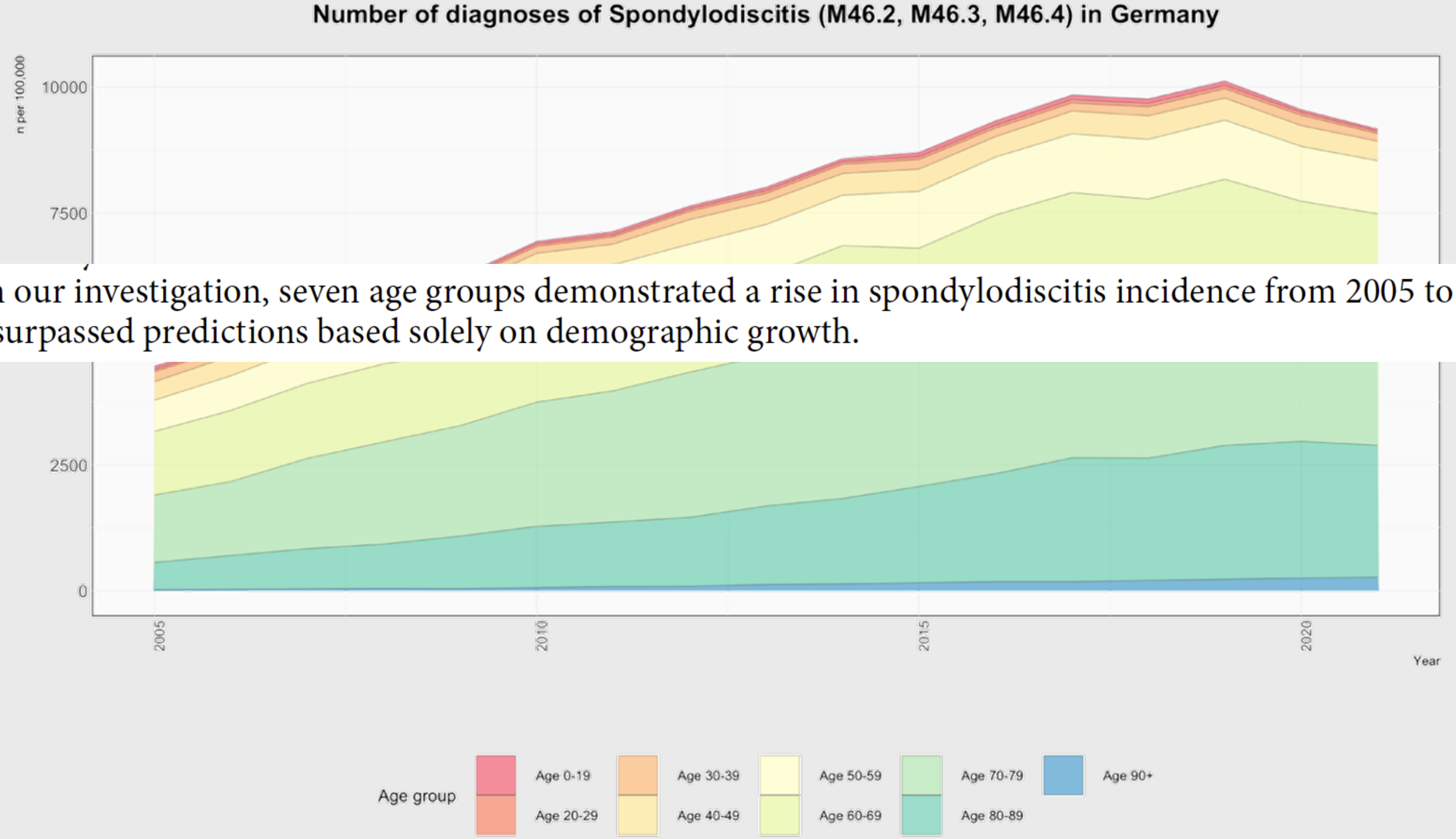
Epidemiologischer Trend

Kramer A et al. Scientific Reports. 2023; 13:20225



Epidemiologischer Trend

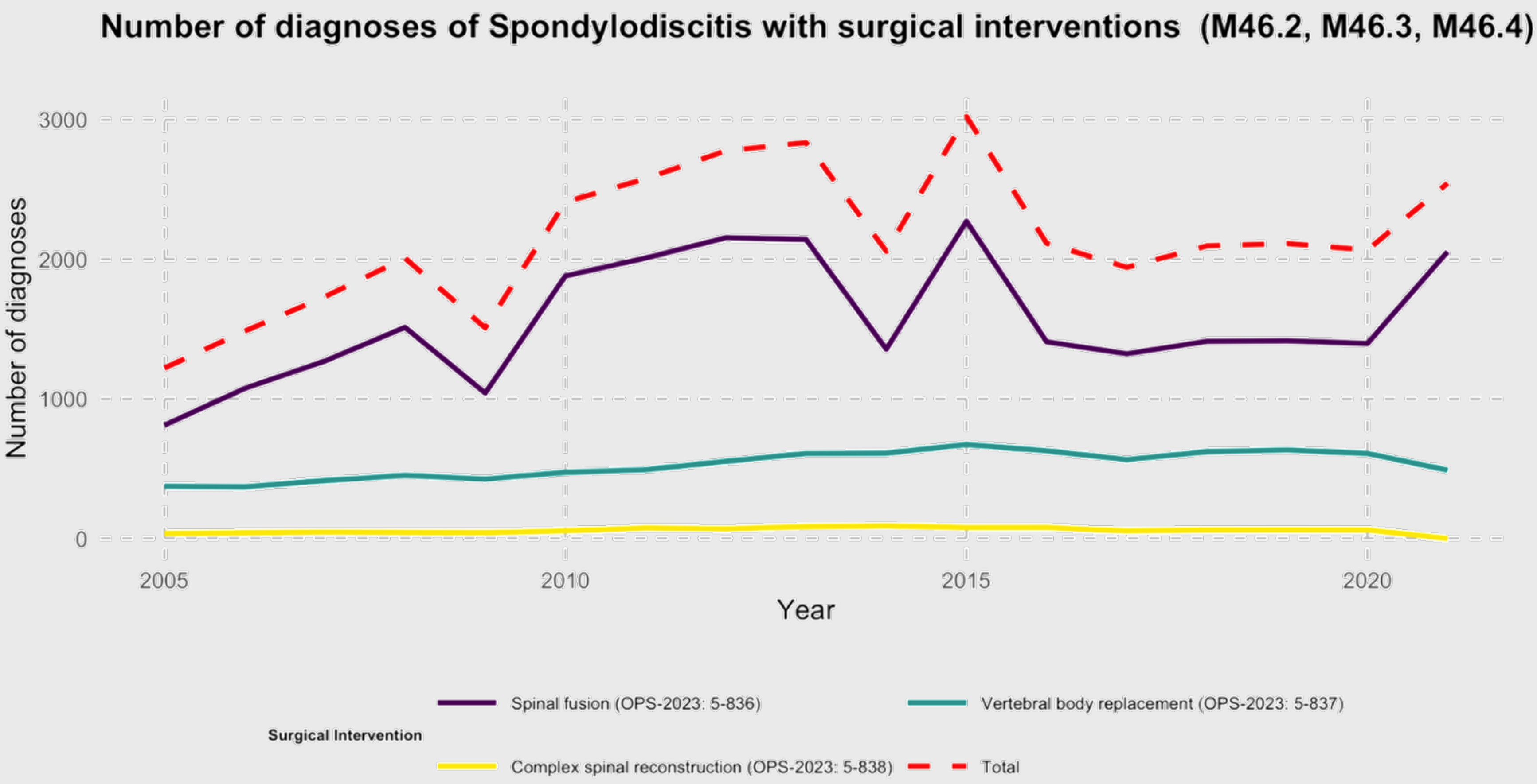
Kramer A et al. Scientific Reports. 2023; 13:20225



In our investigation, seven age groups demonstrated a rise in spondylodiscitis incidence from 2005 to 2021 that surpassed predictions based solely on demographic growth.

Epidemiologischer Trend

Kramer A et al. Scientific Reports. 2023; 13:20225



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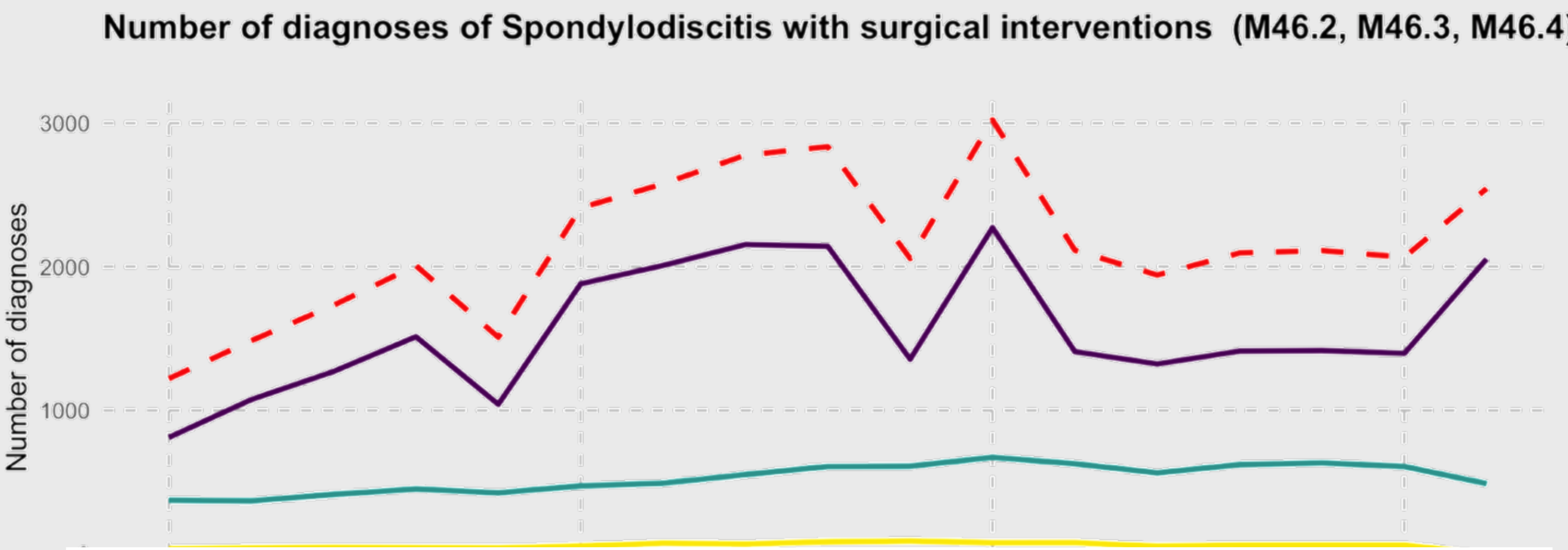


Empfehlung 40 **2020**

Bei Operationsindikationen im Bereich der lumbalen und thorakalen Wirbelsäule sollte primär ein Vorgehen von dorsal erfolgen.

100% Zustimmung (starker Konsens)

Was machen Chirurgen?

Lawson A et al. World Neurosurgery. 2023; 173:e663-e668

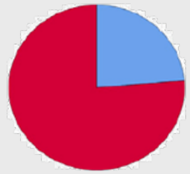
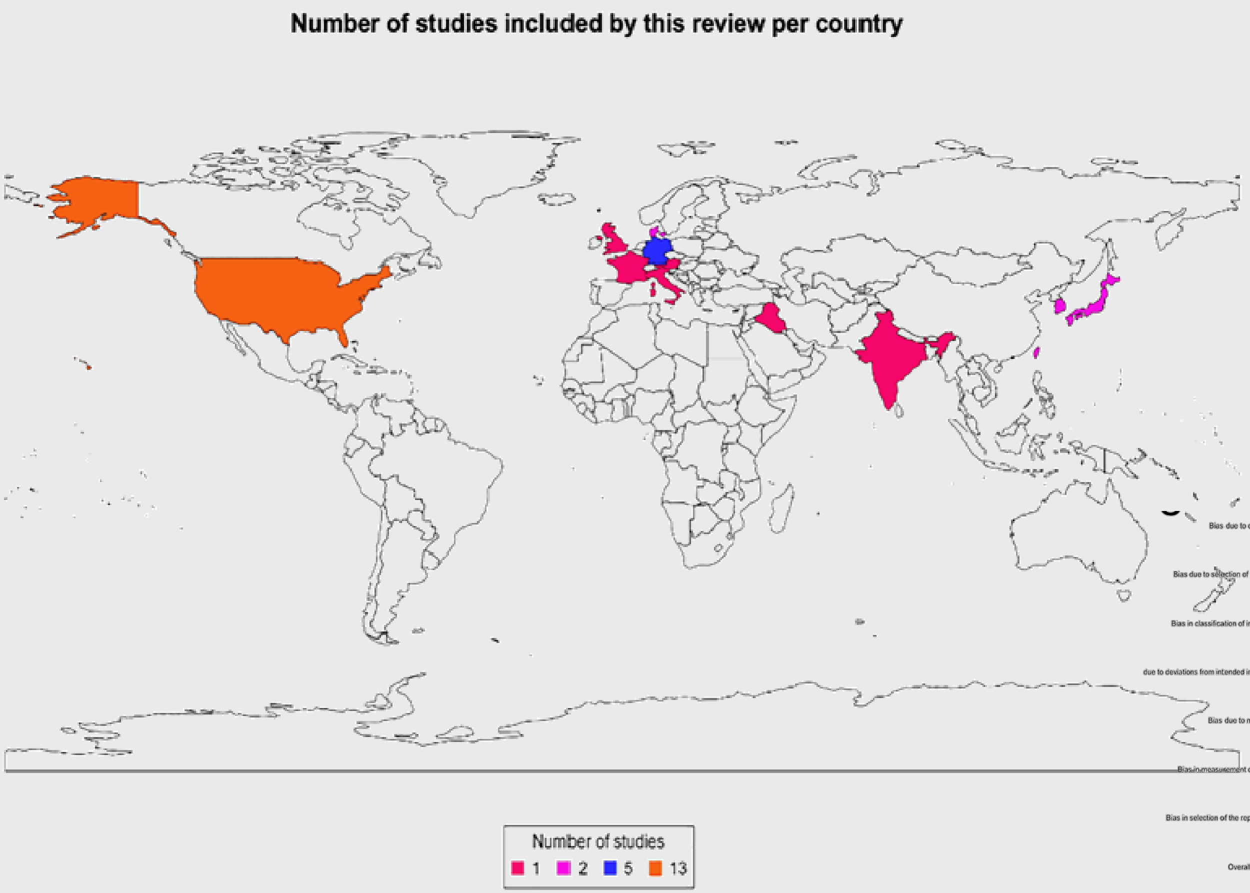
Treatment	Pure discitis (only intervertebral disc involvement) 	Discitis plus involvement/erosion of the adjacent vertebral endplates (without destruction) 	Discitis plus bony destruction of <1/5 of the adjacent vertebral bodies 	Discitis plus bony destruction of ≥1/5 of the adjacent vertebral bodies 
1. Antibiotic therapy	31.6	7.6	3.9	0.0
2. Antibiotic therapy plus bed rest	11.4	11.4	5.3	2.6
3. Antibiotic therapy plus a spinal orthosis	29.1	12.7	14.5	5.1
Sum of those selecting conservative treatment (1-3)	72.1	31.7	23.7	7.7
4. Antibiotic therapy plus operative removal of the infected intervertebral disc	3.8	5.1	3.9	2.6
5. Antibiotic therapy plus dorsal stabilisation +/- removal of the infected intervertebral disc	15.2	32.9	30.3	21.8
6. Antibiotic therapy plus dorsal and ventral stabilisation +/- removal of the infected intervertebral disc	7.6	27.8	42.1	67.9
7. Antibiotic therapy plus ventral stabilisation (without dorsal stabilisation)	1.3	2.5	0.0	0.0
Sum of those selecting operative treatment (4-7)	27.9	68.3	76.3	92.3
Pie charts demonstrating the proportion of respondents selectingconservative (blue) and operative (red) therapy for the specified clinical scenario				

Figure 1. Graphical representation of the percentage figures and proportions of respondents selecting conservative (blue) versus operative (red) treatment options for the various clinical scenarios addressed in the questionnaire.

Operieren oder nicht?

Thavarajasingam S et al. Scientific Reports. 2023; 13:15647



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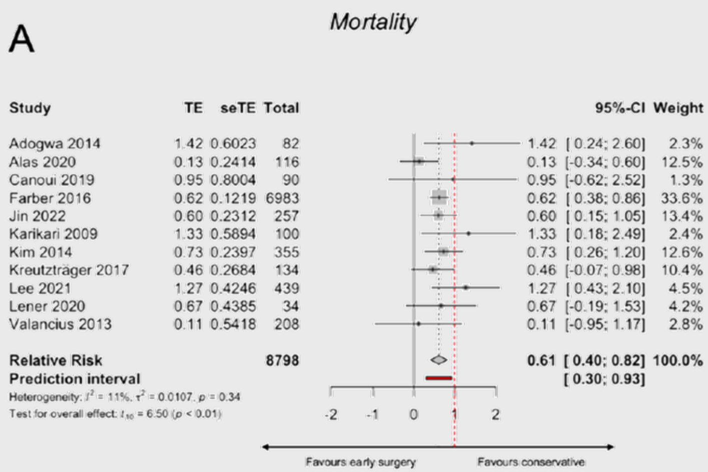
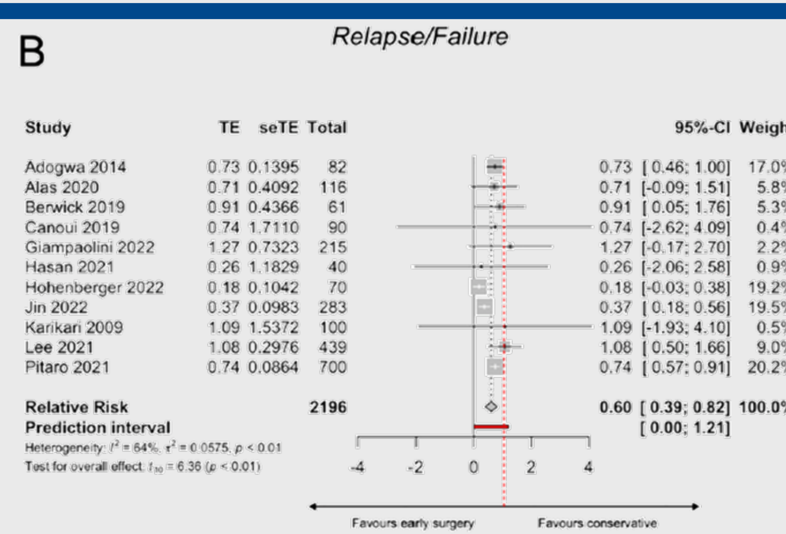
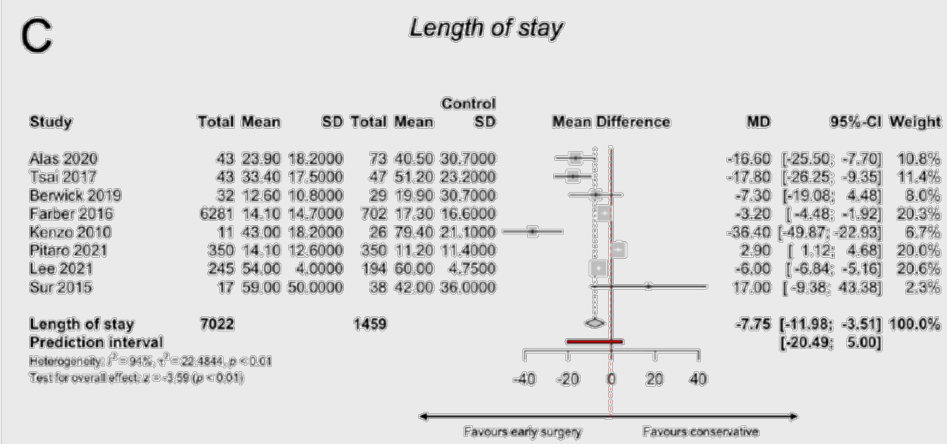


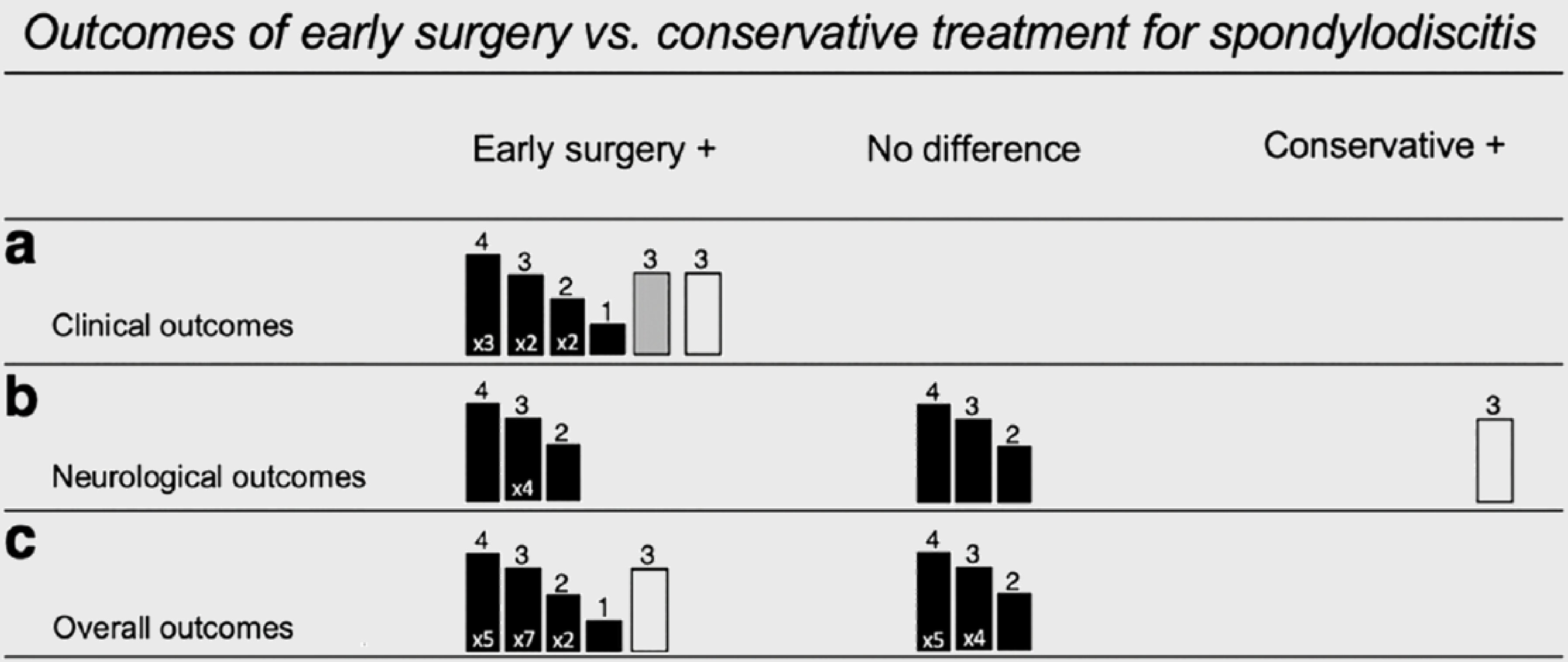




-39% Mortalität
-40% Relapse/Failure
-7,75 Tage Aufenthalt

Operieren oder nicht?

Thavarajasingam S et al. Scientific Reports. 2023; 13:15647



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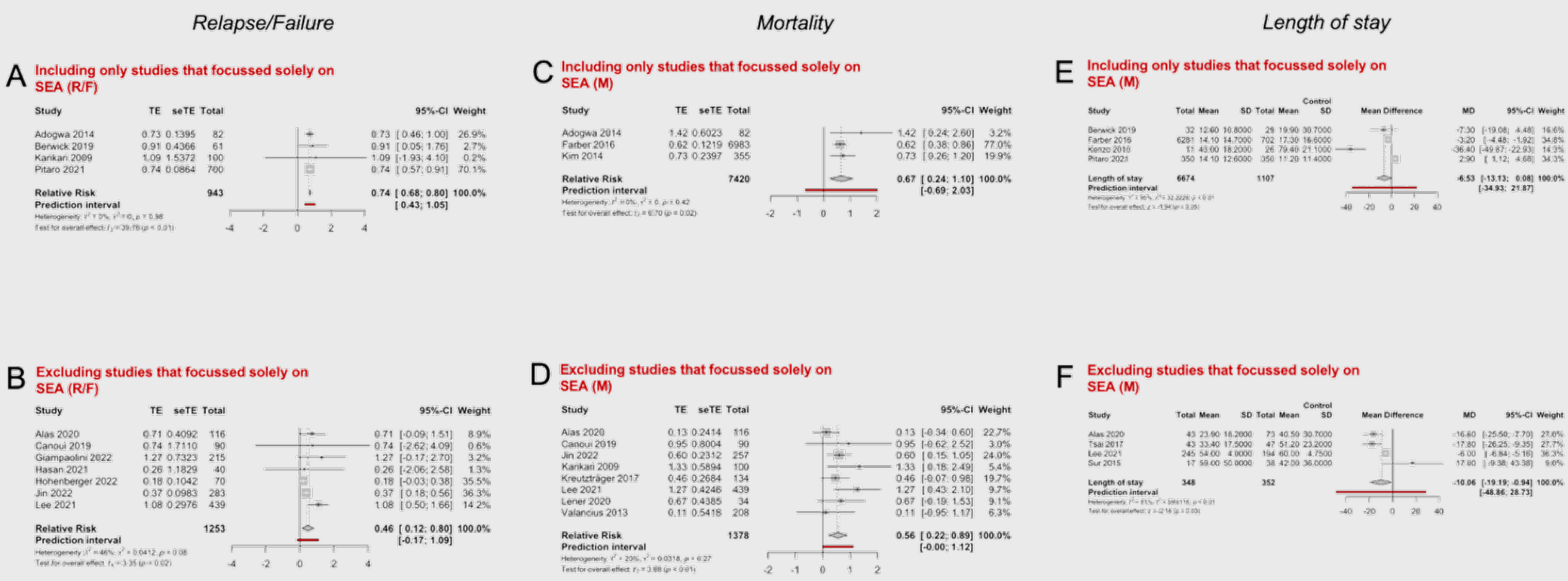

Fazit für Klinik und Praxis

- Dran denken!!!

- Persistierender Rückenschmerz v. a. >70 Jahre – Labor, Rö (DD osteoporotische #)

- MRT mit KM

- neben Neurologie und Instabilität evtl. positiver Effekt auf Gesamtverlauf durch OP