

# Dorsal Instrumentation of the Cervical Spine with the “neon® occipito-cervical system”



M. Stoffel, M. Behr, F. Ringel, L. Roessler, C. Stürer, J. Schramm, and Bernhard Meyer

Department of Neurosurgery, Friedrich-Wilhelms-University Bonn, Germany

## Introduction

### • neon® Instrumentation System:

New modular polyaxial system for the posterior stabilization of the cervical spine from C0 to thoracic levels  
Occipital screws, atlas claws, transarticular, transpedicular, and lateral mass screws, rod system

### • Aim of the study:

To study the suitability of the novel instrumentation system neon® for dorsal instrumentation of the cervical spine in traumatic, degenerative, infectious or neoplastic disease

## Patients and Methods

### • Patient Population:

54 patients (m=31, f=23) included from 07/01 to 12/03  
Median age: 63 years (min:21 y.; max:89 y.)  
80% high risk patients (reduced general condition/poor bone quality)

### • Pathology:

Neoplastic disease n=14  
Traumatic instability n=11  
Degenerative disease n=25  
Infectious disease n=4

### • Surgical stabilization

Prior ventral fixation followed by posterior approach: n=16  
Sole posterior stabilization: n=38

### • Study Design:

Prospective, consecutive database using standard scales

### • Parameters:

Neurological status (Frankel scale, Nurick classification)  
Pre- and postoperative pain (VAS)  
Operating time  
Screw and rod placement (postoperative thin-cut CT scans and plain films)  
Follow-up: clinical exam (Nurick, Karnofsky, VAS, SF-36), plain cervical and cervicothoracic x-ray

## Results

### • Operating Time:

Median 155 min (range 85-335 min) including decompression by laminectomies and fusion

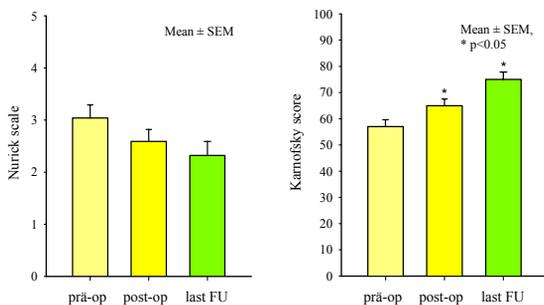
### • Stabilized segments:

Median 4 (range 1-6), reaching from C0 to Th5

### • Implanted material:

A total of 315 screws were implanted, 306 with optimal position in the post-op CT, 9 with suboptimal position out of which 3 had to be corrected surgically.

### • Clinical outcome I (mean follow-up: 9 mo):



Nurick: All patient remained stable or improved after operation except 1, who transiently changed from Nurick 3 to 4.

## Results

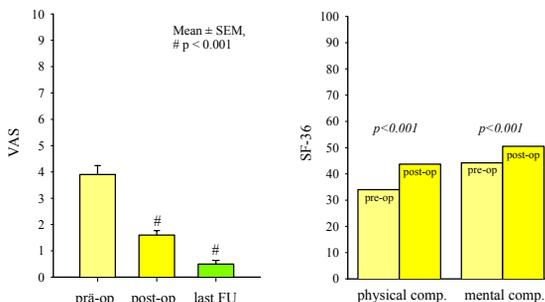
### • Posterior decompression

Laminectomies in n=25, Median 3 levels (range 1-5)  
Hemilaminectomies in n=4, Median 2 level (range 1-3)  
2 level laminoplasty in n=1

### • Spinal alignment:

Correct in all cases postoperatively, without significant secondary loss of correction/material loosening during follow-up

### • Clinical outcome II:



### Long term outcome (i.e. ≥ 12 mo.):

Pending

## Case Illustration

### • Preoperative status

79 yo female pt. with severe myelopathic symptoms, Nurick grade 5.



Fig.2: T<sub>2</sub> weighted MRI scan and cervical myelogram revealing multilevel cervical stenosis reaching from C3/4 to C6/7 with contrast stop at C3/4

### • Surgical therapy

Decompressive laminectomy C3-C6  
Posterior stabilization from C2 (pedicle screws), to C5 and C7 (lateral mass screws) connected with a rod system

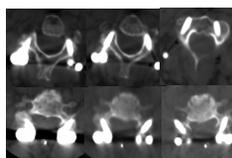


Fig.3: Pedicle screws in C2 (upper) and lateral mass screws in C5 (lower row)



Fig.4: Postoperative plain films

### • Postoperative status

Patient improved to Nurick grade 4 within a few days, construct remained stable until the recent follow-up (15 months)

## Conclusion

- neon® is convenient and extraordinary versatile for posterior instrumentation from the occiput to the upper thoracic spine
- thereby, it enables to avoid the anterior approach with its increased perioperative morbidity in high-risk patients
- provides substantial additional stability to multi-segment anterior constructs
- Study limits at present: long term results are still pending