**Introduction:** Cervical degenerative myelopathy (CDM) is a potentially disabling condition. Functional alterations and microscopic changes occurring in the spondylotic spine may be identified with the help of, respectively, Evoked Potentials and Diffusion Tensor Imaging (DTI). The aim of this study is to determine the correlation between DTI and neurophysiological parameters with the neurological status in CDM patients in order to identify the best responders to decompressive surgery.

**Methods:** 17 CDM patients were assessed with clinical (mJOA and NDI scores), radiological (cervical DTI) and neurophysiological (MEP/SSEP) evaluation, both preoperatively and postoperatively (3 and 12 months). N=8 patients with an improvement of the Hirabayashi ratio of 50% or more and a NDI improvement of >30% were defined as “good responders” to surgery (figure 1).

**Results:** FA values of the cervical spine were higher in “good responder” patients preoperatively (p: 0.02) and postoperatively (p: 0.03 – figure 2), especially at the most stenotic level (p: 0.01 – figure 3). The 75% of “good responder” patients had a preoperative FA higher than 0.6 (p: 0.03 – figure 4). An abnormal preoperative SSEPs value (N8 – tibial nerve) was found in 6/7 of “non responder” patients (p: 0.03); a worsening of N9, N8, and N22 at 3 months was significantly related to a worse clinical outcome at 1 year (respectively p: 0.05; p: 0.03; p: 0.02 – figure 5). These results show that high preoperative values of FA and both median and tibial nerve SSEP might be useful for prognostic evaluation for CSM patients. An abnormal preoperative central conduction time was found in 2/8 of the “good responders” patients with a significant relation with the preoperative mJOA scores (r: -0.55, p: 0.02 – figure 6), showing that MEP are useful for the preoperative assessment of CDM.

**Conclusions:** Our study supports the concept that a multidisciplinary approach can be helpful in the recruitment of the best candidates for surgical decompression.