

# **Inter-observer reliability of the clinical exam of the cervical spine**

J-Y Maigne, F Chantelot, G Chatellier

**Universitary Thesis**

Président : Gilles Chatellier  
Directeur : Jean Yves Maigne  
Résident : François Chantelot

# Reproducibility $\neq$ Validity

- **Reproducibility: measures the ability of a test procedure to be duplicated**
  - Either by the same observer (intra-observer reliability)
  - Or by another one (inter-observer reliability)
- **Validity: degree to which a test procedure accurately measures what it was designed to measure**
  - Differentiate between symptomatic and asymptomatic subjects
  - Determine the culprit lesion
  - Determine the best treatment (manipulation or NSAIDs?)
- Reproducibility is a prerequisite before investigating validity

# Material

- Population
  - Pilot study: 15 patients
  - Study: 59 patients with chronic neck pain (M: 22, F: 37, 42 yrs  $\pm$  12.3)
- Inclusion criteria
  - Neck pain  $\pm$  radiation to the head, upper thoracic area, arm but not below the elbow
  - VAS > 4
- Exclusion criteria
  - Questioning not reliable
  - Workplace accident or litigation

# Clinical Exam

## **One of the 2 examiners**

- Ignore the side & distribution of the pain
- Is alone with the patient
- Random order of examination

## **Oral informed consent of the patient**

# In the sitting position

Range of motion (in degrees) of left and right rotation



Provoked pain in flexion and extension

# In the sitting position



Lateral aspect of SP of T4  
Inter Scapular Point

# In the sitting position

Upper

Medial

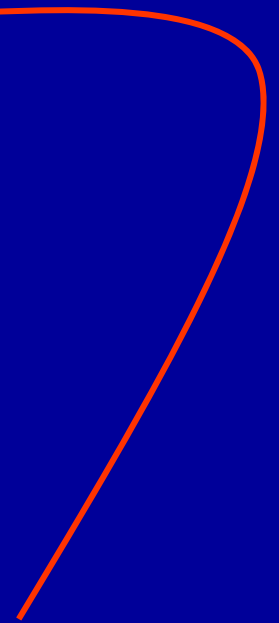
Lower



# In the sitting position



Body of the Trapezius





# Lying suppine Segmental Exam

Looking for segmental  
provoked pain



3 areas of palpation: upper (C0-3),  
median (C3-5) & lower (C5-T1)  
Bony landmarks: spinous process of C7 & C2

# Clinical Exam

## Questionnaire

- “*Indice de Douleur et d’Incapacité Cervicale (INDIC)*”, validated French version of the Neck Pain and Disability Scale
- Evaluation of neck pain and disability

# Statistics

- ***Kappa* coefficient:** inter-rater agreement for qualitative items. It takes into account the agreement occurring by chance
- ***K* interpretation**
  - < 0: No agreement
  - 0.0 - 0.20: Slight agreement
  - 0.21 - 0.40: Fair agreement
  - 0.41 - 0.60: Moderate agreement
  - 0.61 - 0.80: Substantial agreement
  - 0.81 - 1.00: Almost perfect agreement
- **Pearson's *r* coefficient:** measure of the correlation (linear dependence) between two variables

# Results

- Reproducibility of pain provocation in flexion and en extension: **substantial agreement** (k=0.706 et 0.758 respectively)
- Angles of passive neck rotation  $\pm 10^\circ$ : **substantial agreement** (k=0.805 et 0.451 right and left respectively)
- **No correlation** between the most painful side and the most restricted side of rotation

# Results

- Reproducibility of muscle tenderness: **fair to substantial** ( $0.318 < k < 0.620$ , mean=0.44)
- Reproducibility of segmental exam: **moderate** ( $k=0.53$ )
- **Strong correlation** between questionnaire scores and number of tender sites ( $r=0.35$ ,  $p=0.007$ )

# Results

- A link was found between levator scapulae and upper and medium cervical spine involvement
- Not with trapezius or splenius cervicis

# Discussion

# Cervical Mobility in Rotation

- Different protocols found in the literature
  - Goniometer
  - Active mobility
  - Segmental mobility
- 3 studies matching our study.  $K=0.4$  to  $0.6$



# Pain in Flexion / Extension

- Van Suijlecom et al:  $K=0.53$  and  $0.67$   
(*Headache 2000*)
- Cleland et al:  $K=0.55$  and  $0.23$  (*APMR 2006*)
- (Maigne et al:  $K=0.71$  and  $0.76$ )

# Cervical Mobility/Pain

- Pain provocation in flexion or extension  
flexion
  - What does mean “pain in flexion”?
  - And “pain in extension”?
  - To what extent it influences our treatment?
- Range of passive rotation in degrees
  - What does mean a restriction on one or both sides?
  - Influence on our treatment?

# Muscle tenderness

Interexaminer agreement (kappa values) for the tenderness of certain cervical muscles in the available studies.

	Levoska et al.	Andersen and Gaardboe	The present study
Left trapezius	0.15	0.78	0.44
Right trapezius	0.22	0.72	0.53
Left upper semispinalis	–	0.67	0.37
Right upper semispinalis	–	0.71	0.34
Left levator scapulae	0.42	0.71	0.46
Right levator scapulae	0.52	0.58	0.36

No study on splenius cervicis and semispinalis in its 3 parts

# Muscle tenderness

- Fair to moderate agreement, in line with the literature
- Muscle tenderness, what for?
  - No clear relationship between muscular tenderness and a spinal level
  - Target for the manual treatment?
  - Extent of tender sites mirrors the patient's level of pain and disability
  - “Putting the finger right on the actual pain”

# Segmental exam

- Hubka et al: 30 patients with unilateral neck pain. One side exam.  $K=0.68$  (*JMPT 1994*)
- Van Suijlecom et al: 3 areas (upper, median and lower cervical spine).  $K=0.2$  to  $0.6$  (*Headache 2000*)
- Cleland et al: pain at segmental mobility.  $K=0.27$  (C5-6, C6-7: 0.55 and 0.90 respectively) (*APMR 2006*)

# Conclusion

- Overall agreement moderate ( $K=0.44$ ) and acceptable
- None of our test has received validation
- No correlation found between the level and muscle sensitivity excepted for *Levator scapulae*
- “INDIC” Questionnaire scores and number of tender spots highly correlated. **Clinical exam alone enables the clinician to judge the extent of disability**