CLINICAL ASSESSMENT OF THE CERVICAL EXTENSOR MUSCLES DYSFUNCTIONS: A SCOPING REVIEW

Colman D.[1,2], Demoulin C.[1,2], Perrier C.[2], Durieux N.[3], Grosdent S.[1,2], Vanderthommen M.[1,2]

[1] Department of Sport and Rehabilitation Sciences, University of Liege, Liege, Belgium
[2] Department of Physical Medicine and Rehabilitation, Liege University Hospital Center, Liege, Belgium
[3] Research Unit for a life-Course perspective on Health & Education (RUCHE), University of Liege, Liege, Belgium

I. INTRODUCTION

Neck pain is a major cause of disability worldwide and frequently associated with changes in muscle function. These changes, which may persist after the symptoms have disappeared, could explain recurrent or chronic neck pain. Given the functional alterations of the cervical extensors muscles (CEM) observed in subjects with neck pain[1], a review of the clinical ways to highlight these deficits is relevant. To identify the various clinical tests assessing CEM dysfunctions in patients with chronic neck pain (CNP).

II. METHODS

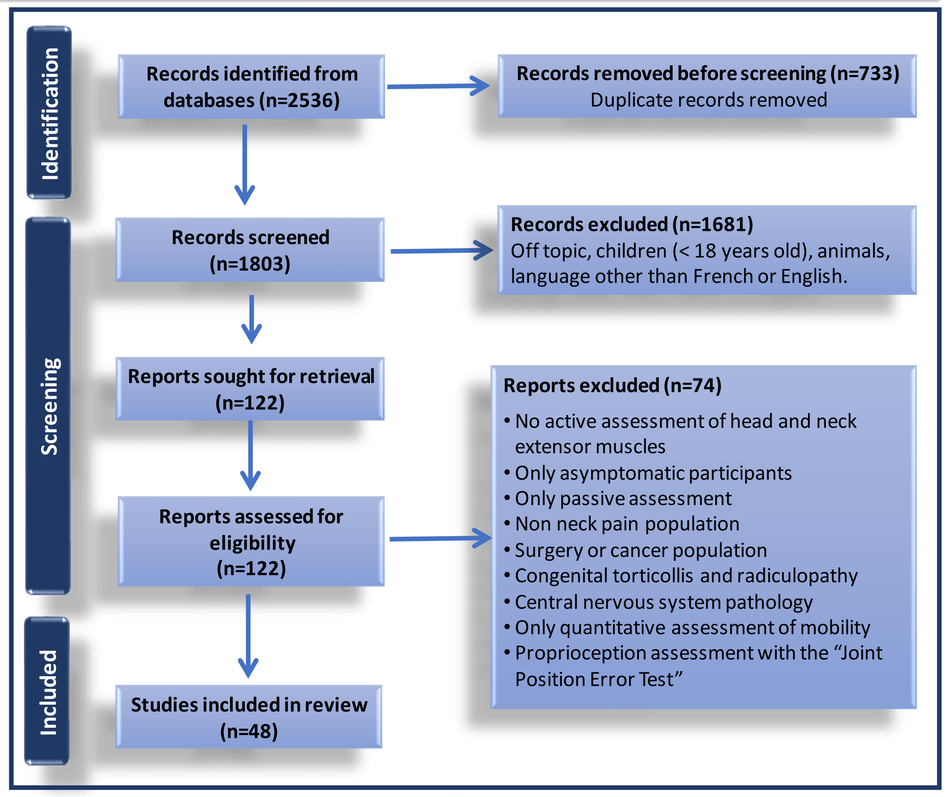
This scoping review, conducted according to the PRISMA guidelines, used MedLine, Scopus, SPORTDiscus and Google Scholar. Only articles focused on active muscle performance assessment of the CEM and including subjects with CNP were selected in a double-blind process.

III. RESULTS

From the 1803 references initially identified, 48 were included (Figure 1). Three kinds of CEM function assessments were used: strength (MS), endurance (END) and motor control (MC) tests.

All protocols of the 28 MS studies were characterised by the assessment of maximal isometric contraction (100%) and were mostly performed in the seated position (65%).
Most protocols of the 24 END studies recorded the maximum holding time in prone position with the head and neck in the table overhang (83%), mostly using an additional load (52%).

Three MC studies described either dynamic dissociation tests or a static test assessing the ability to perform isometric contractions at different intensity levels (Figure 2).



From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71

Figure 1 : PRISMA Flow chart for studies included in the review

STRENGTH (MS) (n=28)				ENDURANCE (END) (n=24)					MOTOR CONTROL (MC) (n=3)	
CONDITIONS										
Max isometric contraction* (n= 27)	Max painless isometric contraction (n=1)			**Hold position*** (n=17)		Hold intensity of contraction (n= 7)			**Static*** (n=2)	Dynamic (n=1)
MODALITIES										
Manual (n=1)	**Dynamometer *** (n=27)			Gravity (n=8)	**Gravity + load *** (n=9)	Dynamometer (n=7)			Dynamometer (n=2)	Gravity (n=1)
POSITIONS										
N/S (n=5)	**Sitting *** (n=18)	Prone (n=4)	Supine (n=1)	**Prone *** (n=17)		N/S (n= 1)	**Sitting *** (n=4)	Prone (n= 3)	Sitting (n=2)	4 point kneeling (n=1)
STATIC										**DYNAMIC**


Pearson et al. 2009


Edmonston et al. 2008


Chen et al. 2018


Li et al. 2019


Segarra et al. 2015

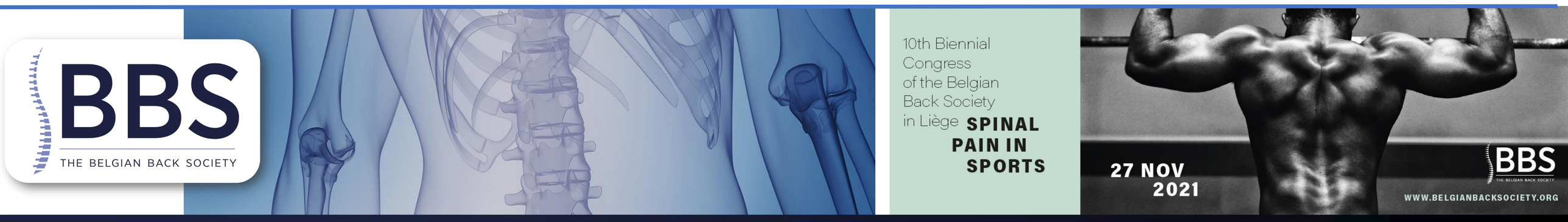
Figure 2 : Clinical assessment of CEM activity in patients with neck pain (N/S = not specified; n = number of studies; * = most frequent)

IV. CONCLUSION

Whereas numerous studies described protocols assessing MS and END of CEM, only 3 studies assessed MC. There was no consensus on the practical aspects of performing the different tests or on a threshold value indicating impaired performance. Further studies on the clinical assessment of functional deficits of the CEM are still needed in subjects with CNP.

REFERENCE

1. Schomacher J, Falla D. **Function and structure of the deep cervical extensor muscles in patients with neck pain.** Man Ther. 2013;18(5):360–6.



dcolman@uliege.be
D. Colman, Department of Sport and Rehabilitation Sciences, University of Liege, ISEPK, B21, 4000 Liege, BELGIUM