Sensorimotor Neck Study, towards an Objective Approach of non-specific neck pain.

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Ethical review	Approved WMO
Status	Recruiting
Health condition type	Other condition
Study type	Observational non invasive

Summary

ID

NL-OMON38322

Source
ToetsingOnline

Brief title
Sensorimotor Neck Study (SNS)

Condition

- Other condition

Synonym
neckpain, Non traumatic neckpain

Health condition

Stoornissen van het houdings en bewegingsapparaat.

Research involving
Human

Sponsors and support

Primary sponsor: Erasmus MC, Universitair Medisch Centrum Rotterdam
Source(s) of monetary or material Support: Ministerie van OC&W

Intervention

Keyword: Eye movements, Neck pain profile, Proprioception

Outcome measures

Primary outcome

The main research variables are the gain (ratio between eye and stimulus

movement) of the COR, VOR and OKR.

The degree of smooth pursuit of the eye in tracking a moving laser dot.

The level of joint position error

The difference in active movement of the upper cervical spine (C0-C3) and the

mid cervical spine (C3-C7).

Secondary outcome

The secondary outcomes are the active ROM of the cervical spine, the perceived

pain and the perceived functioning of the cervical spine.

Study description

Background summary

Non-specific neck pain is a widespread complaint. Non-specific neck pain is a widespread complaint. The overall prevalence of neck pain in the general population ranges between 0.4% and 86.8% (mean: 23.1%) with an estimated 1 year incidence of neck pain from available studies ranges between 10.4% and 21.3%.(Hoy, Protani et al. 2010) . The group of suffering from neck pain seems to be heterogeneous, no age group, high or low anxiety levels or occupation is spared (wright et al., 1999).
In people with non-specific neck pain the mobility and stability of the cervical spine is often decreased. In addition regularly also vertigo,

dizziness and difficulty keeping balance is reported (Eck et al. 2001).
Treleaven (2008) revealed that sensorimotor disturbances could play a role in non-specific neck pain. The term sensorimotor describes all the afferent, efferent, and central integration and processing components involved in maintaining stability in the postural control system through intrinsic motor control properties (Kristjansson et al., 2009).
Afferent information from the vestibular, visual and proprioceptive system of the cervical spine plays an important role in the sensorimotor control of posture and head and eye movements (Treleaven, 2008). The cervical suboccipital muscles rely on afferent and efferent information from the central nervous system, the visual and the vestibular apparatus (Bolton, 1998, Corneil, 2002, Helstrom
2002). One of the reflexes involved in the cervical afferents is the cervical ocular reflex (COR) (Kelders et al., 2006). The COR is interrelated with the vestibule ocular reflex (VOR) and the optokinetic reflex (OKR) this to ensure clear vision with movement (Mergner, 1998).
Stimulation of cervical muscle spindle afferents in asymptomatic individuals through vibration of neck muscles induces disturbances in eye and head position, changes in body sway and the pace and direction of gait and running (Bove 2002, Courtine 2003).
In patients with cervical sensory dysfunction, disturbances in cervical joint position sense (Heikkila, 1996, Treleaven 2003), postural stability (Sjostrom 2003, Treleaven, 2005 a,b, Field 2007) and oculomotor control as altered smooth pursuit (Tjell, 2003, Treleaven 2005 a,b, Storaci 2006) can be present.
Deficits in tests of head and eye movement, an increased gain of the COR and postural stability are found in patients with neck disorders of traumatic origin in association with dizziness (Tjell, 2003, Treleleaven, 2003, 2005a,b, Montfoort, 2006). There is some preliminary evidence that these deficits can also be present in patients with idiopathic neck pain (Kristjansson, 2003, Tjell, 2003, Field, 2007).
Research also has provided evidence of specific deficits in the coordination of the deep and superficial cervical muscles (Jull, 2004). Studies have revealed increased electromyographic amplitude of the large superficial sternocleidomastoid and anterior scalene muscles in patients with neck pain (Falla, 2004, Jull 2004). This was associated with reduced activation of the deep cervical flexors, longus capitis and longus colli and reduced range of cranio cervical flexion (Falla, 2004).
A vast majority of the research that is done throughout the last decade has focused on subgroups of patients with neck pain such as people suffering from neck pain after a car accident or people with chronic neck pain. The deficits in sensorimotor control and accompanying symptoms such as dizziness are more obvious in this group (Tjell, 2003, Treleaven 2003, 2005 a,b, Field, 2007). Nevertheless the main group of patients with neck pain has no history of a car accident or neck pain in a chronic sense (Feyer et al., 2006).
The lack of research which investigates the relationship between non-specific neck pain and a disturbed sensorimotor control and also not being able to make a precise analysis of which system within the sensorimotor system is disturbed

makes it hard to make an exact diagnosis. The effect of this inability is that it is difficult to come to a targeted therapy for non specific neck pain.
The hypothesis of this study is that reflexive eye movement measurements can assist to make the connection between functional impairments and symptoms for non specific pain patients. Recording of eye reflexes might help to objectively assess the severity of complaints of neck pain patients.

Study objective

The overall aim is to develop an objective symptom profile of non specific neckpain patients which addresses more facets of the health problem, including sensorimotor dysfunction. The first stage is the establishment of an objective quantification of sensorimotor dysfunction in people with non specific neckpain.

The main research question is:
Is there a difference in sensorimotor control in people with non specific neck pain compared to people without any neck pain?

In order to get insight into the different elements which are related to the sensorimotor control related to non specific neck pain it is necessary to answer the following questions:
Is there a significant difference between the gain (ratio between eye and stimulus movement) of the cervico-ocular reflex (COR), the vestibulo-ocular reflex (VOR) and the optokineticreflex (OKR) in subjects (aged 18-60) with and without non specific neck pain?
Is there a significant difference in the outcome of the smooth pursuit neck torsion test (SPNT) in people with non-specific neck pain compared to people without non-specific neck pain?
Is there a significant difference in cervical joint position error in people with non-specific neck pain in contradiction to people without non-specific neck pain?
Is there a significant difference in the active movement of the upper cervical spine (C0-C3) and the mid cervical spine (C3-C7) in people with and without non-specific neck pain?
Is there a correlation between the synergy of the gain of the eye reflexes (COR, VOR and OKR) and cervical functionality (range of motion, joint reposition error and the active movement of the upper cervical spine and the mid cervical spine
Is there a correlation between the perceived impairments (Vas, Neck Disability Index and Dizziness Handicap Inventory) and objective parameters (COR, VOR, OKR and spnt)?

Study design

The study design is a cross sectional design.
All the measurements will take place at the same time.

This applies to the group of people with non-specific neck pain and the control group

Study burden and risks

There are no risks related to this study. There are no related physical of psychological side effects to the measurements. The burden of participating is just the invested time. All subjects undergo one measurement which last approximately an hour each.

Contacts

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Trial sites

Listed location countries

Netherlands

Eligibility criteria

Age
Adults (18-64 years)
Elderly (65 years and older)

Inclusion criteria

Subjects are included if the they have non specific neck pain not longer then a year uninterrupted. Only adults (both males and females) under 60 years of age will be included. Subjects should be physically able to undergo COR, VOR and OKR measurements (sitting in a chair for 30 min; biting on a bite-board; staying comfortabel in a dark room). Vision should be good enough to be able to trace a laser dot on a dark background without glasses. Likewise, they should be able of understanding and filling in the questionnaire and giving informed consent. The subjects within the control group should have no complaints of the cervical spine at all. All subjects should have no history of a car accident.

Exclusion criteria

Subjects should not use medication that influences alertness or balance (e.g. benzodiazepines, barbiturates), they should not suffer from any neurological disorder and have no vestibular problems. All subjects with a history of a neck trauma including due to a car accident are excluded.

Study design

Design

Study type:	Observational non invasive
Intervention model:	Other
Allocation:	Non-randomized controlled trial
Masking:	Open (masking not used)

Primary purpose: Diagnostic

Recruitment

NL

Recruitment status:	Recruiting
Start date (anticipated):	02-11-2012
Enrollment:	120
Type:	Actual

Ethics review

Approved WMO

Date:	16-10-2012

Application type:	First submission
Review commission:	METC Erasmus MC, Universitair Medisch Centrum Rotterdam (Rotterdam)

Study registrations

Followed up by the following (possibly more current) registration

No registrations found.

Other (possibly less up-to-date) registrations in this register

No registrations found.

In other registers

Register	ID
CCMO	NL37415.078.12