

# Temporalis exteroceptive suppression in generalized anxiety disorder and major depression

Wei Wang\*, Xian-Ming Fu, Ye-Han Wang

*Anhui Institute of Stereotactic Neurosurgery and Anhui Provincial Hospital, Hefei, Anhui 230001, PR China*

Received 8 February 2000; received in revised form 17 May 2000; accepted 16 June 2000

---

## Abstract

The duration abnormality of the exteroceptive suppressions, or silent periods, of peripheral or jaw-closing muscle activities induced by transcranial magnetic or trigeminal electrical stimuli in patients suffering from anxiety or depression is ill-defined. We therefore studied the exteroceptive suppression periods of the temporalis muscle electromyography elicited by trigeminal territory electrical stimuli, Zuckerman–Kuhlman's Personality Questionnaire, and Plutchik–van Praag's Depression Inventory (PVP) in 12 patients suffering from generalized anxiety disorder (GAD) and 16 from major depression (MD) as well as in 17 healthy volunteers. Durations of the second suppression period (ES2) sociability scores were decreased in GAD patients, while PVP and neuroticism–anxiety scores were elevated in both GAD and MD patients. There was a positive correlation between ES2 duration and sociability score in the GAD group. This study indicates that anxiety can modify the temporalis ES2 duration through cortical descending inhibitory controls. © 2000 Elsevier Science Ireland Ltd. All rights reserved.

*Keywords:* Electromyography; Personality questionnaire; Temporalis muscle ES2

---

## 1. Introduction

A slight painful stimulus over the mental nerves induces early (ES1) and late (ES2) exteroceptive

suppressions, or silent periods, of jaw-closing muscle activity (for recent studies, see Ellrich et al., 1997; Cruccu and Romaniello, 1998). ES1 is assumed to be a pontine di- or oligosynaptic reflex and ES2 is considered to be a pontomedullary polysynaptic circuit reflecting the excitability of inhibitory brain stem interneurons, which are located in the medullary reticular formation near the spinal trigeminal nucleus (pars

---

\* Corresponding author. Tel: +86-551-2652797 ext. 3273; fax: +86-551-2646997.

*E-mail address:* wang\_wei@mail.hf.ah.cn (W. Wang).

caudalis) (reviewed in Schoenen, 1993a). Because of the different methods employed, ES2 duration abnormalities in patients suffering from chronic tension-type headache, temporomandibular disorder and chronic low back pain are controversial (reviewed in De Laat et al., 1998). For instance, the reduced or abolished temporalis ES2 after labial commissure stimulation in chronic tension-type headache sufferers is reported in some earlier studies but not in later ones (e.g. Schoenen et al., 1987; Bendtsen et al., 1996; reviewed in Schoenen and Bendtsen, 2000). Physiologically, the inhibitory brain stem interneurons mediating ES2 receive strong input from limbic brain structures like the periaqueductal gray matter or raphe magnus nucleus, while the periaqueductal gray matter receives input from the medial prefrontal and insular cortex (reviewed in Bandler and Shipley, 1994). The shortened or abolished ES2 suggests that these interneurons are less activated or excessively inhibited.

The descending control of ES2 interneurons from limbic brain areas was supported by studies showing that the labial commissure-induced temporalis/masseter ES2 is inhibited by stimuli applied to the peripheral upper limbs (Schoenen et al., 1994; Cadden and Newton, 1994), or sometimes by those to the lower limbs (Wang et al., 1999) in healthy volunteers. Studies relevant to ES2 abnormality due to cortical or mental alterations are less conclusive. ES2 duration is shortened by experimental attentional exercises (Cadden and Newton, 1995), but not influenced by different levels of clinical anxiety associated with masticatory dysfunction (Nowlin and Bailey, 1985). Transcranial electrical and magnetic stimulation studies indicate that cortical-stimulation-induced exteroceptive suppression is influenced by inhibitory function per se (Triggs et al., 1993; Brasil-Neto et al., 1995), and shortened in conditions such as Alzheimer's disease (Perretti et al., 1996), hepatic encephalopathy (Nolano et al., 1997), and stroke (Kukowski and Haug, 1992; Braune and Fritz, 1995) probably via cortical or subcortical inhibitory dysfunction. However, ES2 was not significantly shortened in patients with headache due to meningitis (Paulus et al., 1992). The ES2 duration was reduced in five untreated

patients suffering from unipolar endogenous depression (Schoenen, 1993b), but in patients with chronic tension-type headache, the reduced ES2 duration was not significantly correlated with depression scores (Dawans et al., 1991).

The present study was designed to clarify two questions: (1) whether the ES2 duration is abnormal in patients suffering from well-defined mental diseases such as generalized anxiety disorder (GAD) and major depression (MD); and (2) whether the ES2 duration is correlated with scores for anxiety and depression in these two conditions. Based on the evidence that cortical structures project to limbic brain areas and then to brain stem interneurons, we hypothesized that ES2 duration would be shorter in GAD and MD patients, and the shortened ES2 duration would be positively correlated with anxiety and depression scales. We studied temporalis exteroceptive suppression, Zuckerman-Kuhlman's Personality Questionnaire (ZKPQ, Zuckerman et al., 1993) and Plutchik-van Praag's Depression Inventory (PVP, Plutchik and van Praag, 1987) in patients with GAD and MD as well as in healthy volunteers. In order to see whether progressive ES2 decrement is correlated with the inventory scores, subjects with an unclear ES2 ( $\leq 5$  ms) or a higher dissimulation score in ZKPQ were eliminated from the study.

## 2. Methods

### 2.1. Subjects

This study was carried out in 55 subjects (19 healthy volunteers and 36 patients); for reasons explained later (see Section 3), data were only collected from 45 subjects: 17 healthy volunteers (aged 27.8 years  $\pm$  12.9 S.D.; 10 women and seven men) recruited as controls among the hospital staff and medical students, and 28 patients suffering from either GAD ( $n = 12$ ; aged 28.8  $\pm$  11.5; six women and six men) or MD ( $n = 16$ ; aged 27.7  $\pm$  10.4; six women and 10 men) diagnosed according to the Diagnostic and Statistical Manual of Mental Disorders, 4th edition (DSM-IV,

متن کامل مقاله

دریافت فوری ←

**ISI**Articles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات