



Ursula Galli

**STRESS- AND PAIN (DYS-)REGULATION
IN CHRONIC OROFACIAL PAIN**



Cuvillier Verlag Göttingen

STRESS - AND PAIN - (DYS) REGULATION IN CHRONIC OROFACIAL PAIN

Ursula Galli

Bibliografische Information der Deutschen Nationalbibliothek

Die Deutsche Nationalbibliothek verzeichnet diese Publikation in der Deutschen Nationalbibliografie; detaillierte bibliografische Daten sind im Internet über <http://dnb.ddb.de> abrufbar.

1. Aufl. - Göttingen : Cuvillier, 2008

Zugl.: Zürich, Univ., Diss., 2008

978-3-86727-780-8

This thesis was accepted as a doctoral dissertation by the Faculty of Arts
of the University of Zürich in the winter semester 2008 on the
recommendation of Professor Dr. Ulrike Ehlert and PD Dr. Jens Gaab

© CUVILLIER VERLAG, Göttingen 2008

Nonnenstieg 8, 37075 Göttingen

Telefon: 0551-54724-0

Telefax: 0551-54724-21

www.cuvillier.de

Alle Rechte vorbehalten. Ohne ausdrückliche Genehmigung des Verlages ist es nicht gestattet, das Buch oder Teile daraus auf fotomechanischem Weg (Fotokopie, Mikrokopie) zu vervielfältigen.

1. Auflage, 2008

Gedruckt auf säurefreiem Papier

978-3-86727-780-8

ACKNOWLEDGEMENTS

I'm very thankful to many people for all their support and contributions to this dissertation.

First of all, I would like to thank my supervisor Prof. Dr. Ulrike Ehlert, who aroused my interest several years ago not only in psychological and psychotherapeutic approaches in somatic medicine but also in the necessity to couple it with scientific thinking and research. She gave me the opportunity to realize this dissertation with the support of her department.

Next I would like to thank Prof. Dr. Sandro Palla, my superior at the Center for Oral Medicine, Dental and Maxillo-Facial Surgery at the University of Zurich and my clinical supervisor of this dissertation. He always emphasized the importance of an interdisciplinary approach in pain therapy and supported it with great commitment. His open-mindedness towards psychology in dentistry combined with positive and constructive criticism were stimulating and instructive during the whole process of this project. I am very grateful for the opportunity to realize this work in his clinic by combining everyday work with this research project.

My explicit thanks are addressed to PD Dr. Jens Gaab, who has been my main mentor and supervisor during this dissertation. He supported my work in every way possible. I'm very grateful for his encouraging attitude and for his assistance. He gave me constant support and helped me with scientific questions, planning of the work and a lot of practical advice.

I would like to express my thanks to my students, Eva Baeyens, Regula Hanselmann, Alexandre Müller, Jasmin Nägeli, Anouscha Schodjai and Caroline Spirig who helped especially with the data collection during many hours.

Furthermore I'm very thankful for all the clinical support of my colleagues Dr. Dominik Ettlin and Dr. Fidel Ruggia. A special thanks to Dr. Dominik Ettlin and lic.phil Elaine Melliger for the careful proofreading of both articles and the manuscript.

I would like to thank my team-colleagues lic.phil. Marisa Schenk and lic.phil Annelis Wegmann whose reliable support made it possible to combine clinical work and research in a feasible manner. I would like to thank my family and friends from near

and far-away for supporting and motivating me, whenever I ran out of energy. Further I'm grateful to all the volunteer patients who made the studies possible.

Last but not least I express my deepest gratitude to my husband Luca for all his support, patience and encouragement throughout the duration of this work. Thank you, Luca, for being here and helping me not to forget that there is more to life than working and doing research!

SUMMARY

The aim of this research was to examine patients with chronic orofacial pain with regard to two significant facets of stress and pain regulation – on the one hand the neuroendocrinological system of the hypothalamic-pituitary-adrenal axis and on the other hand subjective illness beliefs, as measured by Leventhal's self-regulation model (SRM) (Leventhal et al., 1998). The significant effect of psychological and psychosocial factors on the chronicity of pain has been proved in numerous empirical studies and although stress has been investigated for some time as one of the most important psychosocial factors of chronic orofacial pain, there are hardly any studies that examine the underlying mechanisms of the hypothalamic-pituitary-adrenal axis. For this reason we conducted two studies at the interdisciplinary orofacial pain consultant service at the Center for Dental and Oral Medicine and Cranio-maxillofacial Surgery of the University of Zurich.

The first study investigated a possible dysregulation of the HPA axis by means of the "low-dose dexamethasone test". Twenty patients (17 females, 3 males) with chronic myogenous facial pain were dentally examined according to the criteria for RDC/TMD. Further, each underwent a personal interview and completed a series of questionnaires (DIAX, HADS-D, Fatigue Scale, VAS Scales of pain intensity and quality of sleep). The control group comprised 20 healthy subjects, matched by gender, age and BMI. Salivary cortisol was measured on two consecutive days (awakening and daytime profile). 0,5 mg of dexamethasone was administered on the first evening.

Results: in comparison to controls, chronic myogenous facial pain patients showed enhanced and prolonged suppression of cortisol following the administration of 0,5 mg of dexamethasone. Unstimulated cortisol response to awakening and daytime cortisol levels did not differ between the groups. Dysregulation in terms of enhanced negative feedback suppression exists in chronic myogenous facial pain.

The second study investigated the predictive value of illness beliefs on therapy outcome in patients with chronic orofacial pain, as measured by the *SRM*. Relations

could be found between subjective illness beliefs and physical as well as psychological adjustment in various chronic illnesses. No research is available to date with regard to chronic orofacial pain. 152 consecutive patients referred to the interdisciplinary orofacial pain consultant service at the Center for Dental and Oral Medicine and Cranio-maxillofacial Surgery, University of Zurich received questionnaires to assess pain and pain related disability, anxiety, depression as well as physical and mental quality of life at three time points: prior to treatment, three and six months after beginning of treatment. Results: Significant improvement over time was found for all outcome measures except mental quality of life. Results of the regression analysis indicated that believing pain could have serious consequences on one's life (IPQ subscale consequences) is one of the most important predictors for treatment outcome regarding pain as well as mood in patients with chronic orofacial pain. The belief in low personal control and in a chronic timeline are shown to be predictive for outcome as well, explaining however a smaller proportion of variance. These results provided evidence that even when controlled for pain and mood, beliefs about pain are important predictors for treatment outcome and need to be considered in the management of patients with chronic orofacial pain. Asking patients about their view of illness can provide essential information about these important predictors.

Taken together both studies are in line with a multifactorial etiology of chronic facial pain, shifting the perspective away from a local towards a more central etiology with dysregulations in the stress and pain modulating system and pain related beliefs as important psychological determinants of adjustment to chronic pain.

Contents

ACKNOWLEDGEMENTS.....	I
SUMMARY.....	III
FIGURES AND TABLES.....	VII
1 Introduction:.....	1
2 Models of chronic pain.....	4
2.1. Definition: chronic v. acute pain.....	4
2.1. Biopsychosocial model of pain	4
3 Orofacial pain	5
3.1. Definition.....	5
3.2. Diagnostic criteria, classification, differential diagnoses.....	6
3.2.1. Myoarthropathies of the masticatory system (MAP)	6
3.2.2. Persistent idiopathic facial pain and persistent idiopathic odontalgia.....	7
3.2.3. Deafferentiation pain / neuropathic pain	7
3.2.4. Burning mouth syndrome (BMS).....	7
3.2.5. Trigeminal neuralgia	8
3.2.6. Primary headaches: orofacial migraine, tension type headache.....	8
3.2.7. Summary	9
3.3. Epidemiology	9
3.3.1 Prevalence	9
3.3.2. Gender distribution, age distribution.....	10
3.4. Comorbidities	10
3.4.1. Functional somatic disorders.....	11
3.4.2. Depression and anxiety	12
3.5. Pain chronification: risk factors and influencing factors.....	14
3.5.1. Psychosocial risk factors	14
3.5.2. The role of parafunctions	14
3.6. Conclusion.....	17
4 Stress.....	17
4.1. Development of the psychobiological stress models	17
4.2. The role of the hypothalamic-pituitary-adrenal (HPA) axis.....	20
4.2.1. HPA axis dysregulation - hypercortisolism	21
4.2.2. HPA axis dysregulation - hypocortisolism	22
4.2.3. HPA axis dysregulation in chronic pain.....	23
4.2.4. Psychological determinants of the HPA axis stress response	24
4.3. Conclusion.....	26
5 Leventhal's self-regulation model (SRM)	27
5.1. Description and development.....	27
5.2. Dimensions	28
5.3. Significance of the self-regulation model for adjustment to chronic pain	29
5.3.1. Pain intensity and symptom reduction	30
5.3.2. Quality of life	30
5.3.3. Depression and anxiety	31

5.4. The “Illness Perception Questionnaire IPQ-R”	31
5.5. Conclusion.....	32
6 Perspective	32
7 Empirical studies	33
7.1. Enhanced negative feedback sensitivity of the hypothalamus-pituitary-adrenal-axis in chronic orofacial myogeneous facial pain	33
7.2. Do illness perceptions predict treatment outcomes in chronic orofacial pain patients? A 6-month follow-up study	49
8. Reference list.....	70

FIGURES AND TABLES

Figure 1	A schematic drawing of some of the symptoms and signs causing pain and dysfunction in the orofacial region (Suvinen et al., 2005)	5
Figure 2	Psychosocial and physical factors potentially modifying and exacerbating the effects of stressors (Gameira, 2006)	16
Figure 3	Mediators and modulators of the stress response and development of allostatic load (McEwen, 1998a)	19
Figure 4	Schematic of the stress cascade (Miller & O'Callaghan, 2002)	20
Figure 5	Components of the self-regulation model (Hobro, 2001)	28
Figure 6	Awakening salivary cortisol levels before and after the administration of 0.5mg dexamethasone at 11 pm on Day 1 of patients with chronic myogenous facial pain and healthy controls.	41
Figure 7	Circadian salivary free cortisol levels before and after the administration of 0.5mg dexamethasone at 11 pm on Day 1 of patients with chronic myogenous facial pain and healthy controls.	42
Figure 8	Area under the awakening cortisol response curve with respect to ground after the administration of 0.5mg dexamethasone at 11 pm on Day 1 of patients with chronic myogenous facial pain and healthy controls.	43
Figure 9	Flow chart of participants through the study	56
Table 1	Psychometric characteristics of patients with myogenous facial pain and healthy controls	44
Table 2	Mean (SD) scores or percentage for participants and non-participants	57
Table 3	Mean (SD) scores or percentage for outcome variables T1 – T3 (3 and 6 months after first consultation) and MANOVA	60
Table 4	Correlations between IPQ subscales and outcome measures	61
Table 5	Stepwise multiple regression for predicting pain intensity, pain related disability, mood and mental quality of life at 3-month assessment	64
Table 6	Stepwise multiple regression for predicting pain intensity, pain related disability, mood and mental quality of life at 6-month assessment	65

