The Masticatory Apparatus: Stress, Pain and Dysfunction

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For a long time stressors have been related etiologically to craniomandibular disorders (CMD). In the sixties and seventies the relationship was been used especially to explain the etiology of bruxism. Since then our knowledge on the etiology of bruxism and CMDs as well as the impact that stressors have on body integrity has increased tremendously. While the acute stress response is physiologic in that it represents the body's immediate or long-term reaction to a physical or psychological stressor that endangers homeostasis, chronic stress has negative consequences on the subject's health and is therefore involved as a cofactor in the etiology of several pathologies.

The relationship between stress, orofacial pain, and health in general was the topic of a 2-day scientific meeting organized by the Collège Nationale d'Occlusodontologie (CNO) held in Brest, March 13 and 14. The scientific committee, led by Dr Céline Bodéré, invited 24 speakers to discuss in 7 sessions the consequences that chronic stress has on the nervous system, psyche, immune response, orofacial pain, CMD, bruxism, mucosa and skin, as well as on the dentist himself/herself. The topics of stress therapy and prevention were also addressed.

The following briefly outlines selected topics.

The first 2 sessions "From Basic to Clinics" and "Clinical Consequences" started with a review lecture by Dr J-C LeMével on the physiology and neurophysiology of the stress reaction and discussed the diversity and complexity of the central interplays that allow body adaptation. Dr R. Dallel spoke about the relationship of stress to pain and addressed in particular the relationship between the autonomic nervous system and pain sensitivity. He pointed to the existence of a descending pain inhibitory system activated by increased blood pressure and mediated by the arterial baroreceptors. An increase in blood pressure leads to hypoalgesia in normotensive subjects but not in normotensive patients with chronic painful CMD, indicating that these patients have a dysfunction of the baroreceptor-related pain modulation mechanism. The session continued with lectures on the effect of physical training on the activity of the cardiovascular system as well as on pain in healthy and diseased subjects. Dr F. Carré explained that cardiovascular system regulation largely depends upon the interplay between the activity of the sympathetic and parasympathetic systems. Exercise training decreases intrinsic heart rate, increases parasympathetic heart rate variability (HRV), and decreases sympathetic HRV. These changes are due to an increased or decreased response to the parasympathetic/sympathetic drive. Physical exercise also has a positive effect on pain. Indeed, Dr Y-T Bodéré reported that fibromyalgia patients in moderate aerobic endurance physical training showed a progressive pain decrease and a better capacity to cope with pain. This effect is due to an increase in the activity level of the parasympathetic system and a reduction of that of the sympathetic system, which is often overexcited in fibromyalgia patients.

In the next session on "Stress and the Masticatory System," Dr A. Woda explained that stomatodynia is most likely caused by a trigeminal small-fiber sensory neuropathy. He hypothesized that under particular circumstances (eg, for a post-traumatic stress disorder) neuroprotective action by hormonal and neuroactive stereoids on small fibers decreases. As a consequence, the small nerve fibers develop ectopic activity and finally are irreversibly damaged, leading to burning, dysesthesia, dysguesia, and also to changes in saliva composition. Topical application of clonazepam leads to a burning sensation decrease in approximately half of the patients. Dr A. De Laat reviewed the consequences that stress has on the masticatory system: jaw rest position, clenching, stomatodynia, pain. In his overview he discussed also a possible relationship

between stress and CMD. Finally, Dr S. Palla reported that patients with a chronic myogenous facial pain have enhanced negative feedback sensitivity of the hypothalamic-hypophyseal-adrenal (HHA) axis after the intake of a low dose of dexamethasone. This indicates a dysregulation of the HHA axis, a phenomenon reported also for other functional pain states, such as fibromyalgia, chronic fatigue syndrome, chronic pelvic pain, chronic whiplash-associated disorder, and atypical depression. Dr A.-F. Allaz noted that anxiety, depression, and somatization are often associated with chronic orofacial pain, and that anxiety seems more prevalent in patients with chronic orofacial pain than in those with other chronic pain conditions. She reported also recent data recorded in the United States that indicates that the stress due to traumatic experiences may play a greater role in the etiology of chronic orofacial pain than is usually thought.

The session "Dentistry and Stress" was dedicated to the effect that stress has on sleep, bruxism, the skin and mucosa, and periodontitis and orthodontic treatment. Dr G. Lavigne reviewed sleep bruxism, which is part of an arousal response. Eighty percent of sleep-bruxing episodes occur in preparadoxical sleep, and the sequence of events immediately preceding the bruxism episode starts with an increase in the activity of the suprahyoid muscles, accompanied by a deep breath, followed by an increase in the heart rate. Subjects with low-frequency orofacial muscle activity (ie, with a low frequency of bursts/hour and episodes/hour) are more likely to complain on awakening of pain and fatigue of the masticatory muscles than those with higher frequency. This lecture was followed by a description of clinical cases by Dr J.-F. Laluque.

Stress is a risk factor for periodontal disease. Dr J.-O. Pers noted that this negative effect can be the consequence either of a behavioral modification by the stressed subject (increased smoking, decreased oral hygiene) or by a dysfunction of the immune system following the activation of the HHA and sympathetic axes. In addition, surprisingly, he indicated that recent observations of over 200 teeth suggest that bruxism could accelerate attachment loss. Dr L. Misery reported that abnormal cutaneous sensations such as itching and stomatodynia are often related to stress. Itch is initiated by the activation of afferent fibers ("prurireceptors") and transmitted by dedicated C-fiber neurons. There is evidence for an itch-dedicated neuronal network, since histamine application to the skin activates sensory, emotional, and motor areas in the brain, just like a pain stimulus does. It is therefore not surprising that the itch threshold decreases under stress, like the pain threshold. These stress-related abnormal sensations can be effectively treated by means of psychotherapy or by antidepressants, especially the SSRIs, as they act upon the pathophysiologic mechanisms involved in functional disorders.

Lastly, Dr D. Kerouedan and Dr P. Pionchon made the point that a stress situation in the workplace often causes severe psychosocial and socioeconomic problems. Thus, there is a need to develop special programs for the amelioration of workplace stress. The speakers underlined also the high rate of suicides among dentists, which points to dentistry being a particularly stressful profession.

All in all this was a very interesting and stimulating scientific meeting, in which the influence that stress has on health and in particular on the masticatory system was discussed from different perspectives, with each speaker relying as far as possible on scientific evidence. The organizing committee has to be congratulated also for an excellent social program that provided enough time for stimulating scientific and nonscientific discussions among the participants.

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