Title:
Work-related stress: new market opportunities for gnathology:
Clinical cases of complex interdisciplinary rehabilitation:
from allostatic disorder to health
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Keywords:
Health, wellness, trouble, occupational maladjustment syndrome, work-related stress, workplace safety, mouth diseases, occupational medicine, health surveillance, allostatic state, dentists, gnathologists, Planas Neuro-Occlusal Rehabilitation (RNO).

Abstract:
The focus on health, understood as physical, mental and social health, is the health and social challenge of the Europe and the world. The European program “Closing the Gap” showed that the average age of a person’s life dragged on for 85 years, but only 15 years of health, the rest is lived in a status of malaise. The occupational maladjustment syndrome and the work-related stress are the health and social challenge of this century. Reducing people’s dysfunctional troubles means reducing the general occupational maladjustment syndrome and the work-related stress, highly detrimental to the health and quality of life. The synergistic health action of various people destined to improve citizens’ health needs leads to a behavioral requalification both of the environment and of society.

As part of safety at workplace in 2004 the EU introduced the work-related stress risk assessment that shifts the focus on the status of malaise. Mouth early intercepts diseases foreign to her, said WHO in 2007. As part of work-related stress risk assessment the occupational medicine and the health surveillance of the workplace have introduced the obligation to prevent, detect and treat the status of malaise both of general practice and of the workers’ mouth.

The general and local dysfunctional occupational maladjustment syndrome is connected to the allostatic status of instability and it has specific and individual indicators of risk and response times. They open new therapeutic scenarios for gnathologic dentists and especially for those who follow Planas Neuro-Occlusal Rehabilitation RNO.

The complex and combined interdisciplinary rehabilitation needs goals to be shared among health professionals, both doctors and dentists; it has its pivot in the NOR mandibular therapeutic change in posture which deconstructs the symptoms of the general and local maladjustment syndrome and remodels the condition of CNS and PNS from instability to stability conditions.

New therapeutic opportunities and roles for gnathologists are opened, especially for those who follow the Planas & Simoes’ neuro-occlusal rehabilitation: prematurely, the mouth intercepts diseases foreign to her (WHO 2007).

The OCCUPATIONAL MALADJUSTMENT SYNDROME is “The Health and Social Challenge.”

In 2004, in the field of health and safety of the workplace the European Community introduced the work related stress risk assessment: in Europe, the work stress is the second occupational disease. This disease concerns about 40 million people only in Europe, affecting the female gender for 22%. It causes considerable economic and social costs, for example in Italy it creates from 50% to 60% of absenteeism in the workplace according to the percentages released by the Ministry of Health. It creates significant health costs: according to the OSHA, the European Agency for the Safety and Health at Work, the EU spends approximately 20 billion euros annually. It also causes a loss of corporate competitiveness and human resources productivity.

With the estimate of that risk the focus is shifted to the status of malaise of the company and of the human resources “which manifests itself in physical, psychological or social symptoms related to the inability of people to fill a gap between their needs, their expectations and their work.” A prolonged exposure to stress can decrease work efficiency and cause health problems of “physical, psychological and psychosomatic nature.”

There are two stressor environments:
• an “objective” one, linked to company, work organization, working and environment conditions;
• a “subjective” one tied to the worker, their adaptability to environmental pressures both psychological and social, their ability and their required work load.
Occupational medicine and health surveillance are required to prevent, detect and treat the general and local dysfunctional occupational maladjustment syndrome in the fields of medicine and dentistry.

In 2001 the WHO created the ICF Institute with a bio-psycho-social approach correlating health, disease and malaise conditions to medical facilities and functions, to the activity, the participation and the presence of environmental factors and personal facilitators or barriers.

In the ICF classification of disabilities the mouth is missing and only in 2007 the WHO considered it as the alarm bell of other diseases.

The ICF algorithm for the estimation of work-related stress is summarized in the following table:
### Bio-psycho-social risk

**WORK STRESS**

**Part 1:** Conditions of health, malaise and disease  
Human resources condition

**Part 2:** Contextual factors  
Company condition

#### Components

<table>
<thead>
<tr>
<th>Bodily functions and body structures</th>
<th>Activities or participation</th>
<th>Environmental factors</th>
<th>Personal factors</th>
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<tbody>
<tr>
<td><strong>Fields</strong></td>
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<tr>
<td>Bodily functions</td>
<td>Life areas (tasks, actions)</td>
<td>External influences</td>
<td>Internal influences</td>
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<td>body structures</td>
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<td>on functioning and disability</td>
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<td><strong>Results</strong></td>
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<tr>
<td>Change in bodily functions (physiological)</td>
<td>Capacity of executing tasks in a standard environment.</td>
<td>Facilitating or obstructing impact on the features of the physical and social world and of the attitudes</td>
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<tr>
<td>Change in body structures (anatomic)</td>
<td>Capacity of executing tasks in the present environment.</td>
<td>Impact on the person’s features</td>
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</table>

#### Positive aspect

<table>
<thead>
<tr>
<th>Functional and structural integrity</th>
<th>Activities participation</th>
<th>Facilitators</th>
<th>N/A</th>
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<tbody>
<tr>
<td>Stable</td>
<td>Normal functioning</td>
<td>Normal functioning</td>
<td>Physiologic allostatic load</td>
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<td></td>
<td>Physiologic activity</td>
<td>Physiologic activity</td>
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<tr>
<td><strong>Bio-psycho-social competence</strong></td>
<td>Low work stress risk</td>
<td>Low work stress risk</td>
<td>High</td>
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<td></td>
<td>Healthy company and worker</td>
<td>Healthy company and worker</td>
<td>Physiological activity</td>
</tr>
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</table>

#### Negative aspect

<table>
<thead>
<tr>
<th>Handicap</th>
<th>Limited activity</th>
<th>Barriers/Obstacles</th>
<th>N/A</th>
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<tbody>
<tr>
<td>Instable</td>
<td>Allostatic status</td>
<td>Allostatic status</td>
<td>Physiological activity</td>
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<tr>
<td></td>
<td>Occupational and environmental maladjustment</td>
<td>Occupational and environmental maladjustment</td>
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<td>Company and worker's poor health</td>
<td>Company and worker's poor health</td>
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<th>Low</th>
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<tbody>
<tr>
<td><strong>Bio-psycho-social competence</strong></td>
<td><strong>Work stress risk</strong></td>
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The HEALTH SURVEILLANCE of the general and local maladjustment syndrome:
1. is linked to the allostatic status of malaise and instability;
2. has specific and individual risk indicators and reaction times;
3. requires a complex, combined interdisciplinary rehabilitation;
4. requires a therapeutic synergy with the participation of all health branches (dental and medical) as well as occupational medicine;
5. its goals are shared between the different health professionals (physicians and dentists) and they have the NOR MANDIBULAR THERAPEUTIC CHANGE IN POSTURE as pivot, which deconstructs the symptoms of the general and local maladjustment syndrome and remodels the structure of CNS and PNS from instability to stability conditions.

**Neuro-physic-environmental disease**
The dysfunctional occupational maladjustment syndrome triggers for the activation of the mechanism of environmental neurology survival.

Physical, acute, chronic, socio-economic and psychological stressors trigger for the neurovegetative alert status of the amygdala circuit. It is highlighted with the loss of work symmetry and with the allostatic status of instability.

When stress is acute, we enter a reversible physiological allostatic load.
When stress is chronic, we enter an allostatic status, first reversible, then irreversible with 3 stages:

Stage 1 - Hyperactivity & alert
Stage 2 - Resistance – overload and excessive response
Stage 3 - Exhaustion - Inadequate reaction

The amygdala circuit of the CNS triggers for the symptoms of biological fear and status of fight and escape.

The cranial nerve system, the driving system and the mouth come into neurological dissymmetry with the loss of work in symmetry and the choice of one prevalent working side and instability: the mouth is its alarm bell. Figure 1
Each individual is normally fully capable of supporting a short-term exposure to tension, which can be considered as positive. The same individual may react differently to similar situations at different times of their lives → specific adaptation of the individual. Their adaptive response is in allostatic physiological load, which means stability and health with wholesome physiological activity.

The allostatic status of environmental and occupational maladjustment is an indicator of instability and of a status of malaise: it occurs when you have more difficulty in coping with a prolonged exposure to an intense pressure. Moreover, different individuals may react to similar situations differently.

When it comes to the ALLOSTATIC STATUS of INSTABILITY, the specialist can implement two types of preventive actions:

Type 1: homeostatic regulation of the system, when they adjust one parameter at a time, without any overview;

Type 2: allostatic adjustment of the system when they modulate several parameters together. This bio-psycho-social approach is facilitator → it activates a virtuous cycle in anticipation of the CNS→it triggers for an adaptive behavioural change with respect to a wrong variable → It reduces, prevents and intercepts the risk factors for medical and dental health. It deconstructs the allostatic status of individual stress-related maladjustment and the general and local DYSFUNCTIONAL MALADJUSTMENT OCCUPATIONAL SYNDROME.

Goals:

In a virtuous cycle activated in anticipation, the facilitated CNS triggers:
1. for an automatic behavioural change based on multiple parameters;
2. the more this change becomes automatic, the more the sensory and driving perceptions are coordinated;
3. a coordinated perception increases individual skills;
4. the increase and the stabilization of the skills lead to increased performances under workload;
5. Therefore, the work maintenance, the activities and the social participation of the worker are improved.

According to the ICF, prevention of work-related stress correlates dysfunctional and structural health disorders in medical and dental fields, highlighting the goals and the program of therapeutic intervention designed to deconstruct the general and local maladjustment syndrome. The definition of the programs and the therapy steps require a complex interdisciplinary rehabilitation: a neuro-psycho-physical medical optimization and a neuro-occlusal, dental, orthopaedic, orthodontic and prosthetic rehabilitation (see fig.).
According to ICF, within the individual rehabilitative project of the patient, the coordination of CNS and PNS takes place through the NOR mandibular therapeutic change in posture (see fig. 2).

**Therapeutic interventions**
Combined and complex interdisciplinary rehabilitation.
Medical neuro-psycho-physical optimization.
NOR dental, orthopaedic, orthodontic, prosthetic, occlusal rehabilitation.
From disorder and instability of maladjustment to stability/order

HEALTH / STABILITY
Each individual / worker is stable when he finds himself in a status of complete physical, social, psychological well-being.

He has genetically and epigenetically specific, individual characteristic:
- He has BODY STRUCTURES ➔ as symmetrical as possible
- He has BODILY FUNCTIONS ➔ stable, species-specific, functional activity (bilateral balanced occlusion and bodily functions in balance)
- He presents ACTIVITIES AND PARTICIPATION with a well-developed organization and neurological maturation
  - Good cognitive-driving skills ➔ individual functional integrity
  - Good body performances ➔ ability to work
  - Good structural components (reflex mechanisms, automatic elementary mechanisms, synergies). Good postural and movement strategies.
  - Good individual strategies of neuro-psycho-physical, relational, cognitive and emotional attitude.

He has ENVIRONMENTAL FACTORS with good social integration and effective, adaptive, environmental strategies.

Case 1 – An asymptomatic 28-year-old female worker. Stably adapted in physiological allostatic load in PHASE OF HEALTH SURVEILLANCE OF HER ANNUAL STABILITY.

Structural Study

Head and neck conditions: cranial asymmetry
1. A stable, badly occluded mouth counterbalances the patient's skeletal problems
2. Condyle-meniscal compensatory incoordination
3. Genetically-based subclinical specific chronic cervical syndrome
   - Bulging C2-C3 and C3,C4
   - Incomplete and complete somatic fusion of C2-C3
   - Accentuation of the lordosis of the epistropheus tooth

Tooth and periodontal dissymmetry of the mouth

Compensated spatial adaptation in torsion
1. Very evident palatine torus
2. Asymmetrical arches for the extraction of the first superior premolars with contraction of the maxillary (10.1 mm) on the maxillary first molars;
3. Deep bite, inner mandibular block, cross bite on the left;
4. The midlines do not coincide
5. Occlusal plane with Z angle
6. Double occlusion:
   - 1st contact at the level of 16 46, mandibular retrusion and deviation to the left
   - 2nd contact: the mandible moves forwards and it is displaced rightwards
• Class II on the right and the left with class I canine

Cervical-lingual dissymmetry of the epistropheus. Adaptation in torsion

Sagittal plane. Cranial and cervical dissymmetry.
Dyskinesia of SS8 C0 C1 C2 C3. Suspected fusion C4 C5 C6
Vertical hyoid bone twisted at the front Palatal torus
Vertical and sagittal dissymmetry of the jaw and of TMJ 64-66 mm
Deep bite, mandibular block, internal torsion
Strong esosversion of the inferior incisors.
2 visual planes 2 occlusal planes
Skeletal class II due to mandibular retrusion. Normo- and hyper-divergent
With AOBO of class II 9/8 mm
Twisted occlusal plane and Normo- and hypo-divergent.

Tooth-periodontal dissymmetry of the mouth
Morphological asymmetry of the contracted maxillary
Maxillary twisted to the right and mandible twisted to the left
ATM articular dissymmetry: larger, taller and rear condyle to the right due to a fixed mastication on the right. It is also slightly more elongated, dysmorphic and distracted on the left.
Planas dysfunctional masticatory dissymmetry: asymmetric masticatory angles.
Genetically-based subclinical specific chronic cervical syndrome

- Bulging C2-C3 and C3.C4
- Incomplete and complete somatic fusion of C2-C3
- Accentuation of the lordosis of the epistropheus tooth

Functional study: analysis of the specific occlusion of a patient

- Stable, bilateral balanced occlusion by NOR laws
- The cross bite to the left keeps the centre of force in the physiological position
- Protrusive with movement deviated to the right
- Laterality balanced to the right
- Laterality to the left with advanced movement and, then, deflected to the left
- Habitude: good load distribution, stable centre of gravity, prevalent support on the right.
Analysis of jaw movement in normal physiological conditions
Deviation of the mandibular movement on the left
Steep broken protrusion due to cervical instability with condyle-meniscal incoordination
Steep asymmetric chewing angles, mastication on the left
Good activity in myocentric

Occlusal registration. Horizontal plane with Gothic arch. Worsening situation.
Worsened large movements with adaptation in torsion to the right
Small movements in myocentric. Coherent and stable swallowing
Tooth movement
Broke protrusion according to Simoes: paradoxical movement of the cervical spine in the horizontal plane. Condyle-meniscal incoordination, cervical instability C0 C1 C2, cervical skeletal pathology, dysfunctional mastication dissymmetry: worsen asymmetric masticatory angles: unilateral left-sided mastication.

The vertical plane : Lauret’s mask improves the skeletal and cervical pathology, but it is not decisive.
Large movements: adaptation in twist to the left.
Little movements of the myocentric and consistent and stable swallowing
Tooth movement
Broken protrusion according to Simoes: improved condyle-meniscal incoordination; improved cervical instability C0 C1 C2; improved cervical skeletal pathology, but it is not decisive.
Dysfunctional masticatory dissymmetry: asymmetric masticatory angles, favoured unilateral left-sided mastication.

Case 2: complex clinical case

Instable head position: allostatic status. Structural disorder

**Medecine**
1. ictus result
2. hypochondriac psychosis of suicide and depression
3. pelvic inlet syndrome, surgically treated
4. bilateral cataract
5. total pansinusite
6. TDM
7. S. chronic cervical
8. facial neuralgia
9. Hepatitis C

**Dentistry**
Broken Mouth
Structural
Multiple abrasions
Incongruous rehäbilities
Functional Orthopedics
Psychotic extra-stomatognathic
Occlusopathy
Instability of head condition: allostatic status. Entry structural disorder
Frontal plane
1. cranial asymmetry, cranial lateralisation and rotation of the head;
2. occlusal instability of the mouth;
3. hypertrophic asymmetry of the muscles: dysfunctional muscular dissymmetry;
4. cervical-lingual dissymmetry of the epistropheus. Instability in swallowing, strongly contracted palate, tongue without a resting space →
5. Severe, chronic, obstructive, respiratory syndrome, suspected apnoea;
6. Chronic, cervical syndrome, cervical dyskinesia, torsion SSBB C1 C2 C3;
7. Cranial, cervical and mandibular TMD disorder; condyle-meniscal incoordination & TMD dissymmetry; disparallelism between visual, Camper and occlusal plane.
Structural rupture of the mouth:
Strong abrasion of the structures → stomatognathic occlusopathy → structural instability → loss of the vertical dimension of the teeth → double occlusion → posterior contacts with wisdom teeth → forward sliding in protrusion of the mandible in Class III → asymmetrical collapse of the arches

Chalcography: morphologic discrepancy of the structural arches.

Instability and allostatic disorder → Structural stability and order
The therapeutic mandibular change in posture

June 2011 entry position
0.9% population Class III

November 2011 temporary teeth
favourable 17.5 % Class I

February 2012 definitive teeth
favourable 17.5 % Class I

Prognosis of the initial case
Skeletal biretrusion Class III
Mandibular Rotational Type: Anterior (A) Group A3 MDB
0.9% of the population:
mandibular shortening due to an anterior rotation of the mandible.
After correction the occlusal comparator stabilizes.
Tendency to the mesio, tissue growth potential lightened by anterior rotation

Therapeutic goals:
1. Improving vertical dimension
2. Remotion slipping in class III due to wisdom teeth
3. Stabilisation of bone basis and tooth morphology

Prognosis of the case: good definite teeth
Normal position of maxilla and mandible
Skeletal Class I
Mandibular rotational type: anterior (A) + Group A1 NDB
17.5% of the population:
mandibular shortening due to an anterior rotation
Neutral sagittal rotation.
The shortening offsets the greater potential of mandibular growth

June 2011
November 2011
February 2012

Significant improvement in occlusion and head position
There remains the strong opacification of the completely clogged paranasal sinuses
Normal position of the superior maxillary and mandible
Skeletal class I, Index WITS skeletal Class II
Normodivergent subject to brachyfacial hypodivergent
Endoinclination of the superior incisors & endoinclination of the inferior incisors
Retroinclination of the superior incisors & retroinclination of the inferior incisors

Before NOR after NOR

Symmetrization Re-balancing of visual, TMJ and occlusal plane

Functional study: complex interdisciplinary rehabilitation

Analysis of the occlusal barycentre
Start June 2011
Overload on the left

Stomatognathic occlusopathy
10/20/2011 Temporary superior and inferior teeth
Improved loads and barycentre

02/18/012 Bilateral balanced occlusion

Delivery inferior definitive teeth /teeth with a Metal fixed prosthesis
Protrusive 02/20/2012

02/20/2012 Right and left laterality
Extra-stomatognathic occlusopathy - occlusione a bascula
Instability from psychotropic drug.

Temporary teeth

Pharmacologic calibration
Visual interferences. Delivery of the definitive teeth

02/20/2012
Before operation to the right cataract

03/08/2012
After operation to the right cataract

APRIL 16th, 2012: Analysis of the mandibular movements: good
TRACE BIG OPENING
TEETH MOVEMENTS

MUSCULAR ACTIVITY: good
CLOSING
Achieved medical goals:
- Recovered and improved lung function
- Increased space to rest the tongue
- Cervical functionality
- Correct TMD of TMJ
- Improved cranial asymmetry
- Improved lung conditions
- Improved visual plane
- Net decrease of psychiatric drugs

Mouth goals: achieved stomatognathic occlusopathy
- Functional orthopaedic head
- Mandibular posture
- Vertical dimension
- Dental morphology
- Functional occlusion
- Masticatory function

Extra-stomatognathic occlusopathy
Instability related to psychiatric treatment
Correction of the left eye cataract

Still to be monitored before finalizing superior arch
- Pan-sinusitis - waiting for ENT surgery
- Psychiatric therapy - monthly checks
- OS Cataract - waiting for intervention & visual plane
- Burning mouth due to psychiatric drugs
Complex clinical case

Health Surveillance
1- Genetic fibromyalgia
2- Glaucoma
3- BCO therapy for sleep apnea
4- Thyroid problems: total thyroidectomy for papillary thyroid cancer & radiation therapy
5- S. chronic cervical

Case 3: NATALINA

Mouth surveillance
Broken mouth
Structural
Occlusal
Orthopedic
Extra-stomatognathic acclusopathy
Snoring
Results of neck intervention
Structural study

Rehabilitation: the progressive change with rebalancing between Frankfurt, maxillary and occlusal planes

2010
Initial status
Cross bite

2011
temporary teeth & snoring
device & papillary thyroid
cancer

2012
definitive teeth after
intervention

Adaptation
Initial torsion
No alignment

NOR Rebalancing of visual, Camper and occlusal planes

Improved balance between visual, Camper and occlusal planes
In torsion because of thyroid cancer
Under treatment for cervical instability

consistent
visual, Camper and occlusal planes
Functional study of a complex interdisciplinary rehabilitation

Analysis of occlusal centre of gravity

Before 2010-2011: load distribution on the left

10-05-2012: good load distribution

Laterality right and left

Protrusion
The focus on health, understood as physical, mental and social wellbeing, is the health and social challenge of the Europe and the world. The European program “Closing the Gap” showed that the average age of a person’s life dragged on for 85 years, but only 15 years of health, the rest is lived in a status of malaise. The occupational maladjustment syndrome and the work-related stress are the health and social challenge of this century. To this goal are called both the general practice and the dentistry in therapeutic synergy. Optimizing the health needs and the organization of the therapeutic rehabilitation in the health care means reducing direct and indirect health costs with repercussions on other socio-economic issues which are intertwined with the individual health status. Reducing people’s dysfunctional troubles means lessening the general occupational maladjustment syndrome and work-related stress, highly detrimental to the health and quality of life. The synergistic health action of various people destined to improve citizens’ health needs leads to a behavioural requalification both of the environment and of society. Analysing, collecting data, informing, educating and motivating new behaviours and strategies lead to greater efficiency and the productivity of the country. Gaining confidence and stability allows you to choose, know, accept and educate large areas of population on good long-lasting behaviour, in order to direct and plan the choices of the country towards a sustainable economy with shared costs and benefits.