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Managing temporomandibular disorders (TMD) by integrating exercise therapy into therapeutic patient educational programs: why, when, how?

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ABSTRACT

Current evidence based data found in the scientific literature recommend that the therapeutic management of patients suffering from temporomandibular disorders (TMD) should be based initially on simple, conservative and reversible procedures including exercise therapy. The integration of this message into oral health instructions for patients makes it easy for them to keep informed about TMD and aware of the steps they can take to deal with their symptoms.

The integration of exercise therapy into structured patient education programs provides patients with information about TMD and suggests methods to deal with it. This medical approach is similar to those used to treat other joints in the musculoskeletal system.

Easy to set up, this exercise therapy helps patients suffering from temporomandibular disorders to become partners in the conduct of their treatment plan of reducing pain and restoring functional comfort.

KEYWORDS

Temporomandibular disorders,

Exercise therapy,

Therapeutic patient education,

Compliance.

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1 – INTRODUCTION

Early in 2010, the American Association of Dental Research published a revised version[35] of its scientific recommendations first issued in 1996 on the diagnosis and treatment of temporomandibular disorders (TMD).

This document stated that ''*temporomandibular disorders (TMDs) encompass a group of musculoskeletal and neuromuscular conditions that involve the temporomandibular joints (TMJs), the masticatory muscles, and all associated tissues.*''

Because TMD is frequently accompanied by acute or chronic pain and interference with smooth operation of orofacial functioning, it persistently provokes patients to consult dentists in general and orthodontists especially.

A number of factors combine to make the management of therapy for patients suffering from TMD a complex procedure:

- The diversity of its clinical forms;
- The multi-factorial nature of the mechanisms of its etiology that are, essentially genetic, environmental, and psychological;
- The difficulty of establishing a precise diagnosis;
- The usually favorable response to the diverse therapies that are performed no matter what they may be.

The consensus that emerges from a study of the current evidence based data available in the scientific literature[35] reaffirms the principle of *primum non nocere*[8] and indicates that the management of patients suffering from TMD must, fundamentally, consist of therapies that are conservative, simple, and reversible, including maxillo-facial re-education that will be augmented with a home care program, in which patients are taught about their disorder and how to manage their symptoms[9].

Evidence based data suggest that occlusal factors do not play an important role in the etiology of TMD[36,41]. However, these results must be interpreted with prudence. The authors of systematic reviews and meta-analyses are unanimous in deploring their limitations, because of the lack of homogeneity in the methodologies employed by various studies on TMD and of the imprecise definition of the diagnostic criteria applied to discerning temporomandibular disorders[32].

The current absence of proof that occlusal factors cause TMD doesn't mean that, in addition to optimizing facial equilibrium and the beauty of the smile (Fig. 1 a and b) orthodontists should lessen their zeal in achieving the objective of a functional occlusion with excellent inter-digitation, centering, and guidance[31]. Simple common sense suggests this is still a worthy goal.

The use of elasto-positioning as a finishing tool helps in attaining the objective of a functional occlusion that is individualized and takes biological variability into account[14]. We use the appliance Elasto-finisher made on a totally individualized set-up mounted on a SAM articulator with the Axio Split system (Fig. 2).

The objective of this article is to present the indications for maxillo-facial re-education as an element of

a b

Figures 1 a and b
Optimization of facial equilibrium and of the smile.

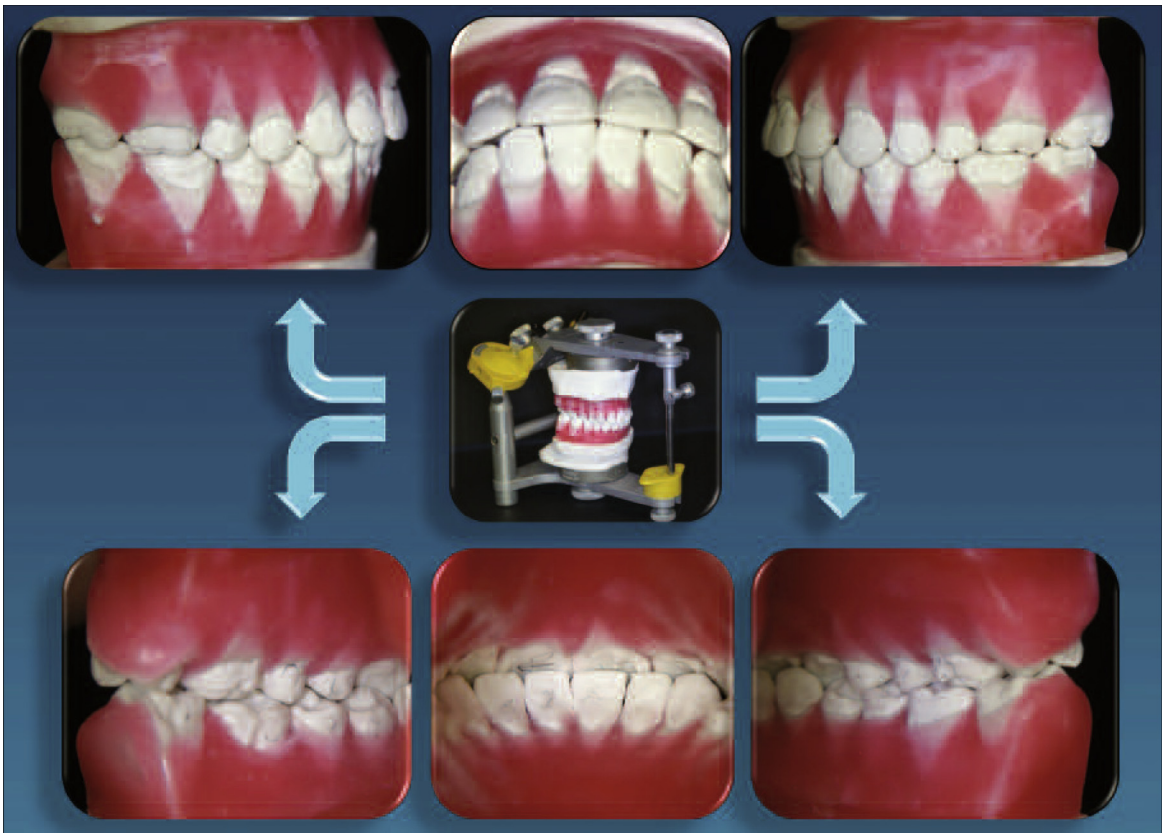


Figure 2
A totally individualized therapeutic set-up made on the SAM articulator, with the Axio Split system. (Elastodontie Laboratory France Elastodontie @).

therapeutic TMD management, and how to integrate it in a planned approach of *therapeutic patient education*, all supported by evidence based data from the literature.

The therapeutic modalities of maxillo-facial re-education include exercises and informative pamphlets.

2 – WHEN TO BEGIN MAXILLO-FACIAL RE-EDUCATION?

Pain, together with articular noises and dyskinesia, is just one of the symptoms of malfunctioning of the masticatory system[6], we agree with J.D. Orthlieb, that French professionals should abandon old terminology and adopt the Anglo-Saxon term TMD, (or DAM), Temporomandibular Disorder and shall use it through this paper.

Basing its conclusions on an exhaustive analysis of the literature, the American Association of Dental Research (AADR) recently re-affirmed the necessity for practitioners to treat TMD with therapies that are non-invasive, simple, and reversible[35].

In this light, it is clear that dentists should employ maxillo-facial re-education as the primary treatment of choice for TMD.

They should propose it to patients after having completed these essential initial steps:

- formed a diagnosis;
- Informed and reassured the patient about the situation;
- relieved pain and reduced inflammation.

2 – 1 – After the establishment of a diagnosis

Practitioners cannot properly treat a patient before they have established a diagnosis and elucidated precise goals of therapy indicated by that diagnosis[44].

The essential bases for diagnosis are the intake interviews, clinical exams, and, when indicated radiographic images of the TMJ[12,35].

TMD symptoms are not specific but J. -D. Orthlieb, *et al*[30] have proposed a diagnostic algorithm. Its use helps practitioners to make a differential diagnosis that will rule out grave etiological factors including tumors, neurological and rhumatological disorders, and trauma, etc that would make the prognosis more delicate.

2 – 2 – After having reassured and informed the patient fully

The first step for practitioners is to reassure anxious patients[20] and restore their confidence in an effort to reduce their emotional distress that might be causing harmful parafunctional habits, reducing their capacity to adapt, and lowering their pain thresholds[3].

The fundamental task is to inform patients of the facts about TMD[2] as spelled out by published data showing that it is not a serious affliction and that health care professionals can deal with it in a non-invasive way. For example:

– there is a high prevalence of the signs and symptoms of TMD in the general population that fluctuates with age[23];
– the signs and symptoms of non-reducible luxation disappear with time and in the absence of any treatment[19,40].

2 – 3 – After relieving pain and treating the inflammation

All patients suffer from anxiety about the rapid onset of TMD and they expect their practitioners to relieve their pain promptly[10].

Practitioners usually rely on anti-inflammatory and analgesic medication to manage pain and inflammation initially, following these up with relaxants and tranquilizers.

The next step is to eliminate exacerbating factors. Orthodontists might, for example, ask patients suffering from pain to temporarily suspend wearing intermaxillary elastics or place miniature bite blocks of glass ionomer cement on molar occlusal surfaces to provide quick relief for the TMJ (Fig. 3).

3 – WHY USE MAXILLO-FACIAL RE-EDUCATION?

There is a broad consensus in the literature that a medically constant maxillo-facial re-education plan based on data presented in the literature and similar to programs used by physicians for other joints in the human musculo-skeletal system should be the basis for all TMD treatment[9,35].

It is a conservative, simple, and reversible therapeutic modality whose effectiveness is reinforced by adapting it to the specific needs and wishes of individual patients in a planned approach of *therapeutic patient education (TPE).*

3 – 1 – General principles of maxillofacial re-education

Treatment of TMD with maxillary-facial re-education has several objectives:

Figure 3
Miniature bite blocks for articular decompression.

– reduce pain;
– correct malfunctioning;
– restore correct articular and muscular functions;
– optimize posture and oro-facial functions.

Exercises used in maxillo-facial re-education are:

– classified in four families grouped in relation to their objectives[38];
– prescribed in the form of individualized programs;
– repeated 3 to 6 times daily by patients in accordance with individual needs;
– organized in sequence, beginning with the incorporation of a specific work posture and supported by the application of heat to reduce neuromuscular excitability;
– composed of movements that must be gentle, progressive, regular, and stopped promptly at the first indication that they are becoming painful;
– easy enough to perform so that patients will integrate them into their daily lives;
– recorded in an exercise calendar so that the regularity of their performance can be demonstrably assured;
– eventually completed when a kinesiologist takes over their management.

3 – 2 – The major groups of maxillary-facial re-education exercises

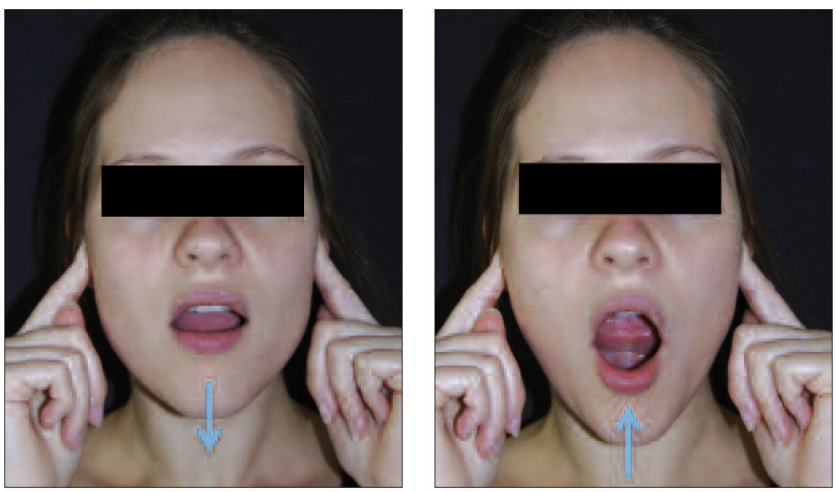
Authors agree that maxillary-facial re-education exercises can be classified in four major groups[1,33,39]:

– Stretching ;
– Against resistance;
– re-coordination ;
– Neck excercises.

3 – 2 – 1 – Stretching exercises

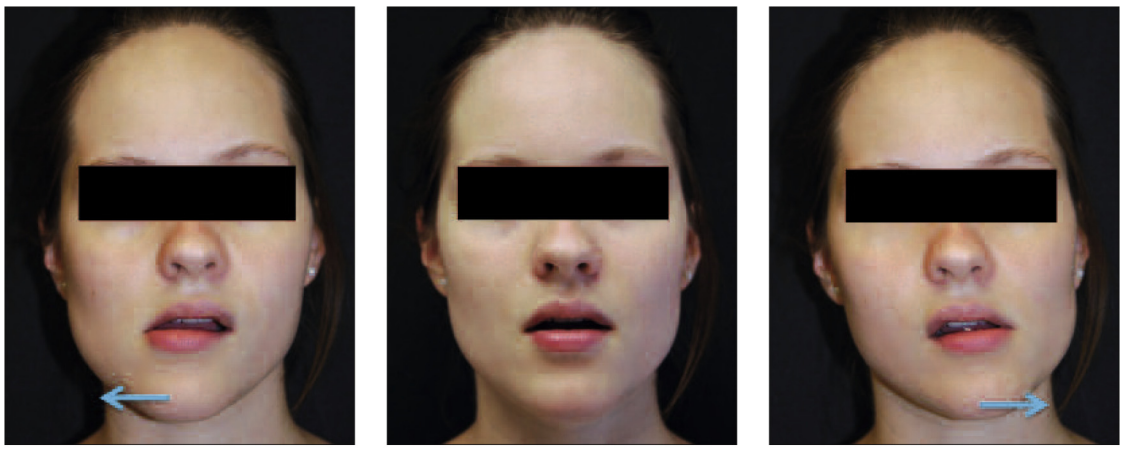
These exercises are designed to improve the mandible's mobility.

To perform them patients open and close their mouths, (Fig. 4 a and 4 b), move the mandible to the right and left (Fig. 5 a to 5 c), and thrust the jaw



a b

Figures 4 a and b
Stretching movements. a: opening; b: closing.



a b c

Figures 5 a to c
Stretching movements a: right lateral; b: starting position; c: left lateral.

a b

Figures 6 a and b
Stretching movements a: propulsive; b: retropulsive.

forward and then retrude it (Fig. 6 a and 6 b).

3 – 2 – 2 – Exercises against resistance

These exercises are designed to:

- reinforce muscular strength;
- inhibit the action of antagonistic muscles responding to contracting muscles stimulated by movement in a Sherrington reflex.

Patients perform these exercises as continuous opening, closing, propulsive (Fig. 7 a to 7 c), and right and left lateral movements (Fig. 8 a and 8 b) with increasing force against resistance.

3 – 2 – 3 – Re-coordinating exercises

These exercises are designed to help patients reprogram the functional cycles of the mandible, by becoming

a b c

Figures 7 a to c
Movements against resistance a: opening; b: closing; c: propulsive.

a b

Figures 8 a and b
Movements against resistance a: right lateral; b: left lateral.

aware of them and correcting any faulty movements that may have become ingrained.

Patients perform the opening and closing movements in front of a mirror upon which they have traced a vertical line (Fig. 9) that allows them to observe any deviations they may be making.

3 – 2 – 4 – Neck exercises

These exercises are designed to relieve tension in cervical and neck muscles.

To perform them patients flex and extend the neck (Fig. 10 a to 10 c) rotate it from side to side and incline it to the right and left.

3 – 3 – Effectiveness of maxillo-facial re-education

Here is the evidence-based data we consulted in descending order of the level of their methodological quality:

- evidence based clinical guides;
- systematic reviews published by the Cochrane Collaboration;
- other systematic reviews;
- original studies.

In a search of French National Authority of Health (HAS[1]) and the National Guideline Clearinghouse (NGC [2]) we found no evidence based clinical guides for maxillo-facial re-education.

Nor did a search of the Cochrane Collaboration [3] uncover any systematic

Figure 9
Working posture for re-coordination exercises.

a b c

Figure 10 a to c
Neck exercises: flexing and extension movements.

Cochrane reviews devoted to the effectiveness of the use of maxillo-facial re-education for patients suffering from TMD.

On the other hand protocols of three systematic reviews in progress seem promising[11,17,34].

In a search of Medline [4] we found several systematic reviews dealing with maxillo-facial re-education in which the conclusions of the most recent were similar[22,25-29,43]:

- the results of the systematic reviews should be interpreted prudently because of a number of methodological problems that vitiate their reliability;
- maxillo-facial re-education, advice on behavior, passive mobilization, and relaxation techniques seem to be effective in ameliorating TMD symptoms;
- the integration of behavioral advice into TMD treatment is desirable, even though no proof of its long-term effectiveness has as yet been demonstrated.

4 – HOW SHOULD MAXILLO-FACIAL RE-EDUCATION BE USED?

The American Association for Dental Research recommends that maxillo-facial re-education should be ''augmented with a home care program, in which patients are taught about their disorder and how to manage their symptoms''[35], which is a forcible way of integrating TMD self help in an overall program of instruction in healthy living.

4 – 1 – The concept of patient education

Patient education is an important component of the concept of patients abandoning their traditional role of being inactive recipients of care provided by authoritative practitioners and becoming fully informed of their situation and participating as equal partners in their own treatment[3,4]. This encompasses three levels of participation, often interwoven with active care [13]:

- education about patient's global health;
- education about patient's specific malady;

Practitioners should become skillful in dealing with each level but because of the limited space available in this article we shall discuss only t*herapeutic patient education* whose name explicitly shows that it's an integral component of treatment.

4 – 2 – Therapeutic education of patients (TPE)

The goal of *therapeutic patient education* is to make patients and their families aware of and competent to assume optimum daily management of life with a malady as a permanent and integral component of treatment[13].

The inclusion of therapeutic education for patients in the HPST, a hospital, patients, and health law promulgated in 2009 (Article 84), made this new relationship of patients

[1] www.has-sante.fr
[2] www.guideline.gov
[3] www.cochrane.org
[4] www.ncbi.nlm.nih.gov

as partners in their own care an official part of French policy.

It views the concept as one that is:

– continuous and integrated into the delivery of care;
– personalized and focused on individual patients;
– adapted to the age of patients, their psychosocial milieu, and the severity of the malady;
– strongly influenced by the quality of the therapeutic relationship[7] between patients, their families, and their care givers.

Therapeutic patient education combines information essential for both preventive and curative treatment.

4 – 3 – The role of TPE in dentofacial orthopedics and orthodontics

Does therapeutic patient education (TPE have a place in dentofacial orthopedics where a critical or life-threatening prognosis is rarely, if ever, an issue? Yes. A number of considerations make the integration of therapeutic patient education into our therapies necessary, even vital.

- TPE is not the exclusive preserve of patients suffering from chronic diseases; it is equally applicable to individuals who have certain risk factors in their health profiles such as arterial hypertension and is also indicated for life situations like pregnancy;
- TPE can help orthodontists strengthen the therapeutic relationships they establish with patients and their families that often begin when they see 6 to 9 year-old children for initial consultations and continue until they take final post-retention records on 20 to 21 year-old.
- It is important to observe that patient education is a procedure similar to the awareness training, functional cognitive education[21], functional education[37], and oro-functional re-education[3,4] (Fig. 11) etc. methods that dentists use in their daily practices to enhance patients' dental awareness and optimize their orofacial functioning in important areas like ventilation[5,42];
- It also seems clear that TPE can solidify and maintain what is perhaps the most crucial element contributing to the success of orthodontic therapy, their compliance.

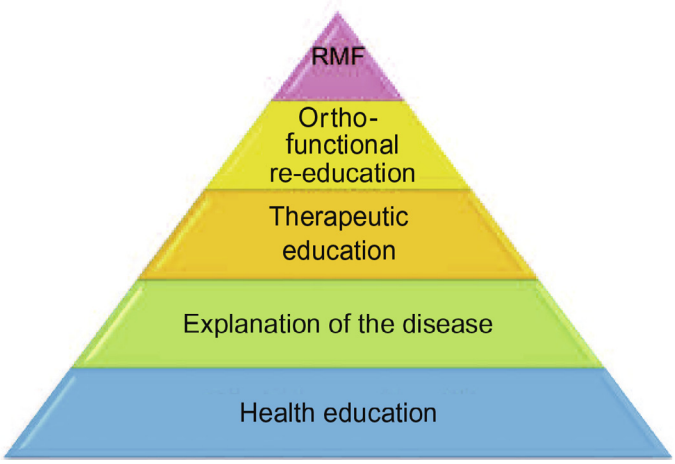


Figure 11
Therapeutic patient education in dentofacial orthopedics[4]. (RMF: Maxillo-facial re-education).

4 – 4 – Integrating maxillo-facial re-education into a TPE program

4 – 4 – 1 – The objectives of therapeutic patient education of a patient suffering from TMD

Clinicians can use therapeutic patient education to establish goals for assisting patients suffering from TMD, and their families:

- stay informed about current data published in the literature on the etiology of TMD;
- to participate actively in the management of the malady;
- to make effective and durable life changes by adhering to principles learned in maxillo-facial re-education, by relaxation, by reducing or eliminating noxious oral habits, and by improving the quality of their physical activity all of which are indispensable to the global management of their disorder;
- to maintain or even improve their quality of life.

4 – 4 – 2 – The stages of therapeutic education of patients suffering from TMD

This educational process is accomplished in four stages[15]:

1. educational diagnosis;
2. definition of objectives and preparation of an educational contract;
3. educational program;
4. evaluation of the results.

4 – 4 – 2 – 1 – The educational diagnosis

This procedure delimits and describes the patient's needs and expectations.

During the course of the intake interview clinicians pose questions that will stimulate patients to provide information about their health behaviors that might affect the malady[15]:

- What is the nature of the ailment?

The clinician explains what TMD is, the severity of the patient's disorder, the possibility of its eventually exerting a negative impact on the patient's quality of live, what treatments have been already used , and identifies other possible eventual health problems.

- What does the patient know?

The clinician evaluates the patient's knowledge of and beliefs about TMD and the treatments available for it.

- How will patients manage their ailment?

Clinicians assess the capacity that their patients possess for adapting to TMD and to its repercussions in their daily lives.

- Patients: who are they, what do they do?

Clinicians explore the ramifications of the behavior of patients in the context of their family, social, and professional environments and the constraints to which they are subjected. They also identify possible projects and other sources of motivation suitable for individual patients.

- What do patients want?

Clinicians should ask patients what results they expect from their TMD treatment.

After having information about patients, much of which was already recorded in their medical histories, clinicians can define, in cooperation with their patients, what objectives can be anticipated from the course of treatment.

4 – 4 – 2 – 2 – Definition of objectives and preparation of the education contract

- The definition of objectives

There are three types of objectives:

– ***Health objectives***

Their goal is to improve physical well by improving, for example, the extent of mandibular movements

– ***Behavioral objectives***

Their goal is to improve activities conducive to improved health (for example, getting physical exercise and following a maxillo-facial re-education program) and to encourage patients to change or lessen unfavorable habits like gum chewing or nail biting and to reduce consumption of stimulants like coffee, black tea, and alcohol.

– **Psycho-social objectives**

Their goal is to adjust factors that influence the behavior of patients by analyzing unhealthy sociocultural, environmental, and financial influences so as to effectively and permanently improve their orofacial functioning;

These objectives should be:

– **precise, measureable and time limited** such as cutting down gum chewing by 50% in a three week period or increasing extent of jaw opening by 5 mm in 4 weeks;
– **goals** that patients can **realistically** accomplish and be designed to meet the actual needs of the individual patient;
– **placed in a priority order** based on their importance to the individual health needs of patients and the probability of patients' complying with them;
– **non-specific,** that is applicable to the majority of patients or **specifically** designed to meet the needs of individual patients such as singers whose professional activities require wide mouth opening;
– **negotiated with patients** to respond to their desires. This cooperative effort will enhance future cooperation;
– **revised regularly** to adapt to data recovered during treatment sessions.

- **Preparing an education contract**

This written document, personalized and prepared in collaboration with the patient, formalizes the treatment plan in a way that is adapted to the needs of patients and the constraints they confront. It transcribes:

– the final version of the negotiated objective in terms of the health, behavioral, and psychosocial aspects of the patient's therapeutic education;
– the description of the content and the programming of the PTE.

In this way patients provide a fully informed consent to the treatment plan, which is accordingly reinforced by a projected joint effort with the responsibilities of each partner clearly defined and the limitations of the clinician's responsibilities especially clarified.

4 – 4 – 2 – 3 – The Education Program

- **Educating isn't informing**

An education program prepared for patients suffering from TMD is not

designed solely to improve their understanding of the disorder that afflicts them but, more important, to improve their health and their quality of life.

The information in the program is necessary but not sufficient. The program must stimulate patients to participate actively in their treatment and to make lasting changes in their health behavior.

- **Contents of an education program**

A variety of tools, logbooks, log sheets, workbooks, CD-ROMs, action plans, and videos, and pedagogical techniques, problem resolution training, project solving, and Socratic and intuitive methods, useful for a practical patient education program. But frequently the simplest techniques, reinforced by the clinician's empathy and common sense, are the most effective.

It is important to emphasize certain key elements:

– clinicians' attentive listening, empathy, and approval of the patient's efforts without being judgmental, strengthens the therapeutic alliance;
– clinicians must deliver positive, understandable, explicit and fully synthesized messages;
– patients must view the first steps of the program as realistic and manageable;
– patients' families must be able to observe the movements accomplished in the education program so that they can provide positive reinforcement;
– audiovisual and written components of the education program complete but do not replace the oral information that the therapist presents;
– the education program is personalized, centered on the patient, and organized in priority units of initiation, and continuing modules of specified instruction and duration designed for the patient's specific needs and preferences;
– the central element of the program should be the doctor-patient relationship beginning with the introductory oral presentation, supplemented with written and audio-visual material, on the educational procedures. The practitioner then demonstrates the exercises, asks patients to repeat them, giving encouragement and correction where needed;
– after the dentist's initial presentation, dental assistants can serve as mentors of patients learning how to accomplish exercises under the dentist's supervision to assure the procedure is neither shortened nor distorted.

Among the tools at a dentist's disposal, *the plan of action* is especially well designed for management of TMD. Dentists give this personalized document to all patients and after they have read it, review its contents, explaining any obscure points, and being sure they comprehend and accept it.

In it patients find:

– the exercises that must be performed in their education programs;
– what to do if they experience pain;
– suggestions on how to manage environmental factors like, for example, the situations encountered at work and how to optimize their health behavior;
– advice on eliminating or decreasing their consumption of stimulants like alcohol, black tea and coffee etc.;
– recommendation on how to relax and deal with conflicts;
– how to reduce sedentary preoccupations like TV watching or playing

video games and how to commit to outdoor activities.

It is worth noting that orthodontists are experienced in ortho-functional re-education[4,5] elements of which they routinely present to patients who are mouth breathers or tongue thrusters.

- **Examples of maxillo-facial re-education programs**

In the limited space available for this article, we can only suggest the general outlines of exercises offered in a re-education program[9], depending on the DTM' type. It is worth noting that TPE should be implemented as soon pain and inflammation have been adequately managed.

– **Protective muscle splinting of elevator muscles**
– explanation and counseling about health behavior, for example reduction of gum chewing, elimination of noxious habits;
– stretching exercises;
– excercises against resistance (Sherrington reflex or reciprocal inhibition: inhibition of the antagonistic muscles in response to the contraction of the muscles during the exercise).

– **Contraction of the mandible's elevator muscles**
– explanation and behavioral counseling about abating gum chewing, reducing noxious habits such as day time tooth clenching, and learning how to relax muscles;
– stretching exercises;
– exercises against resistance.

– **An avoidance reflex** may persist after the interference that provoked it has been eliminated. Therapist helps patients to deal with this by explaining what is happening and showing them how to perform re-coordination exercises.

– **Hypermobility of the mandible**
– explanation and behavioral counseling including how to reduce extent of mandibular opening during yawning (Fig. 12) and how to strengthen elevator muscles and flaccid ligaments by performing exercises against resistance;
– showing patients how to perform exercises against resistance to strengthen the mandibular elevator muscles.

– **TMJ subluxation**
– explanations and behavioral counseling on how to reduce mandibular opening during yawning (Fig. 12), how to limit jaw opening by reducing the size of food particles, and how to perform against resistance exercises to strengthen the elevator muscles.

– **Bruxism**
– explanations and behavioral counseling;
– re-education of the habitual rest position of the mandible.

– **Disc dislocation with reduction**
– explanation and behavioral counseling;
– re-coordination exercises;
– then, after several appointments, showing patients how to strengthen the elevator muscles and the flaccid ligaments with against resistance exercises.

– **Disc dislocation without reduction**
– explanations and behavioral counseling;
– stretching and re-coordination exercises.

– **Tense muscles in the neck and cervical area**

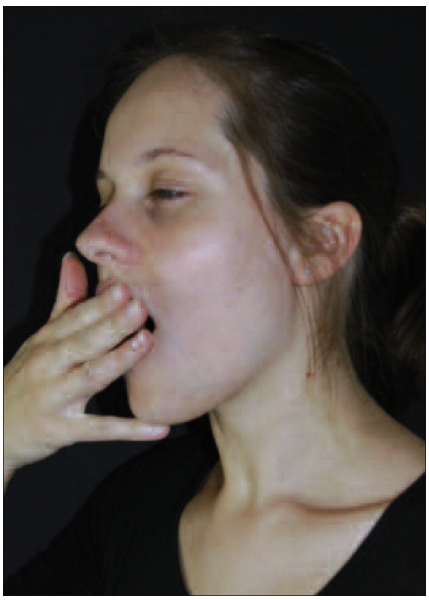


Figure 12
Limiting jaw opening during yawning with finger pressure.

– explanations and behavioral counseling;
– neck exercises.

4 – 4 – 2 – 4 – Evaluating results

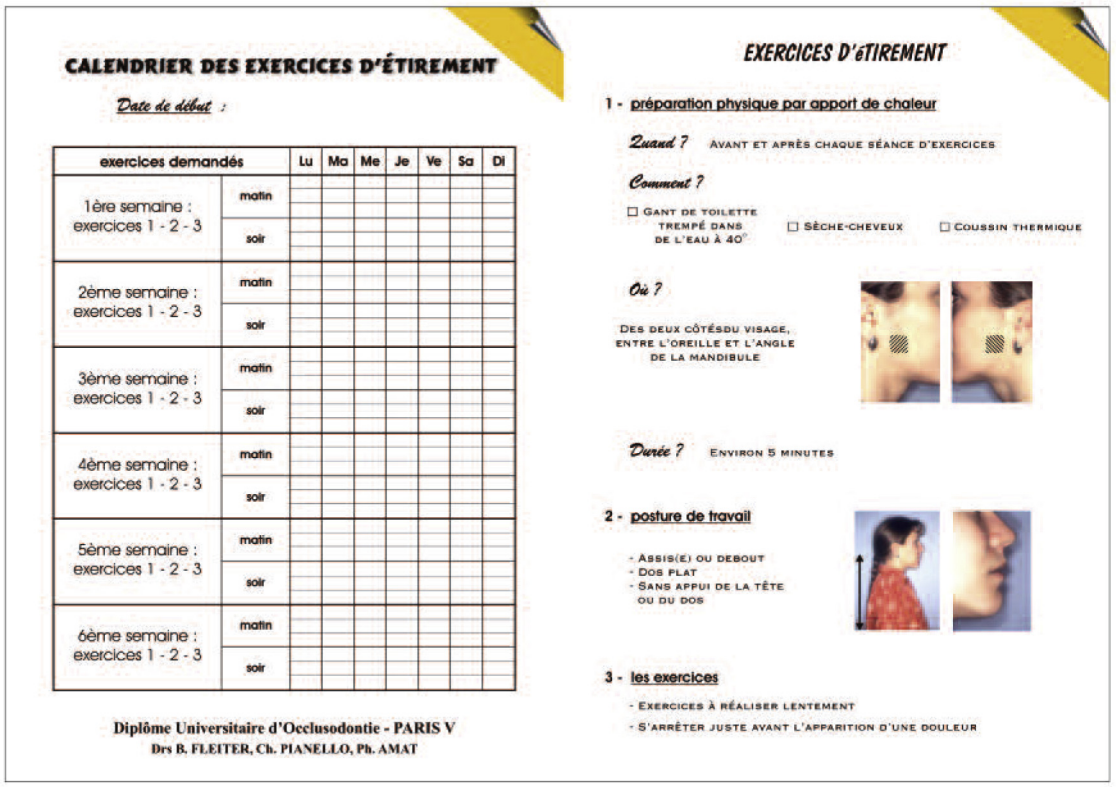
Either the orthodontist or an assistant evaluates results considering improvements made in the three areas of objectives, health, behavior, and psychosocial adjustment that were delineated in the education contract after each appointment and in a final assessment. This evaluation records how well patients have digested information about TMD, how well they have performed the maxillo-facial re-education exercises, and how well they have dealt with exacerbating factors like stress, bruxism, nail biting, and habits like gum chewing. Patients demonstrate how well they have acquired a working posture and report their own evaluation of their progress in reducing TMD distress and improving their quality of life.

With this information in hand the doctor-patient team can re-schedule future appointments to conform to the patient's current TMD status and determine whether auxiliary treatment with occlusodontists, physical therapists, or psychotherapists are indicated.

If a patients adherence to the program decreases it is important for therapists not to be judgmental and to express sympathy and understanding[7] using each appointment to offer patients positive reinforcement. Therapists should re-emphasize the educational messages of the program and assure patients that they are respected and understood. These confidence-boosting strategies of active and empathic listening can often bolster cooperation and help patients eventually make lasting beneficial changes in their health behavior.

4 – 5 – Benefits of using written material in maxillo-facial re-education for TMD

Written educational material is particularly well suited for maxillo-facial re-education for patients suffering from TMD. Pamphlets given to patients after they have heard oral explanations of the disorder serve to reinforce what they have learned and help them conduct assigned exercises. They can reassure patients they are performing these exercises correctly and help them inform family members what the nature of the



CALENDRIER DES EXERCICES D'ÉTIREMENT

Date de début :

exercices demandés		Lu	Ma	Me	Je	Ve	Sa	Di
1ère semaine : exercices 1 - 2 - 3	matin							
	soir							
2ème semaine : exercices 1 - 2 - 3	matin							
	soir							
3ème semaine : exercices 1 - 2 - 3	matin							
	soir							
4ème semaine : exercices 1 - 2 - 3	matin							
	soir							
5ème semaine : exercices 1 - 2 - 3	matin							
	soir							
6ème semaine : exercices 1 - 2 - 3	matin							
	soir							

Diplôme Universitaire d'Occlusodontie - PARIS V
Drs B. FLEITER, Ch. PIANELLO, Ph. AMAT

EXERCICES D'éTIREMENT

1 - préparation physique par apport de chaleur

Quand ? AVANT ET APRÈS CHAQUE SÉANCE D'EXERCICES

Comment ?

☐ GANT DE TOILETTE TREMPÉ DANS DE L'EAU À 40° ☐ SÈCHE-CHEVEUX ☐ COUSSIN THERMIQUE

Où ?

DES DEUX CÔTÉSDU VISAGE, ENTRE L'OREILLE ET L'ANGLE DE LA MANDIBULE

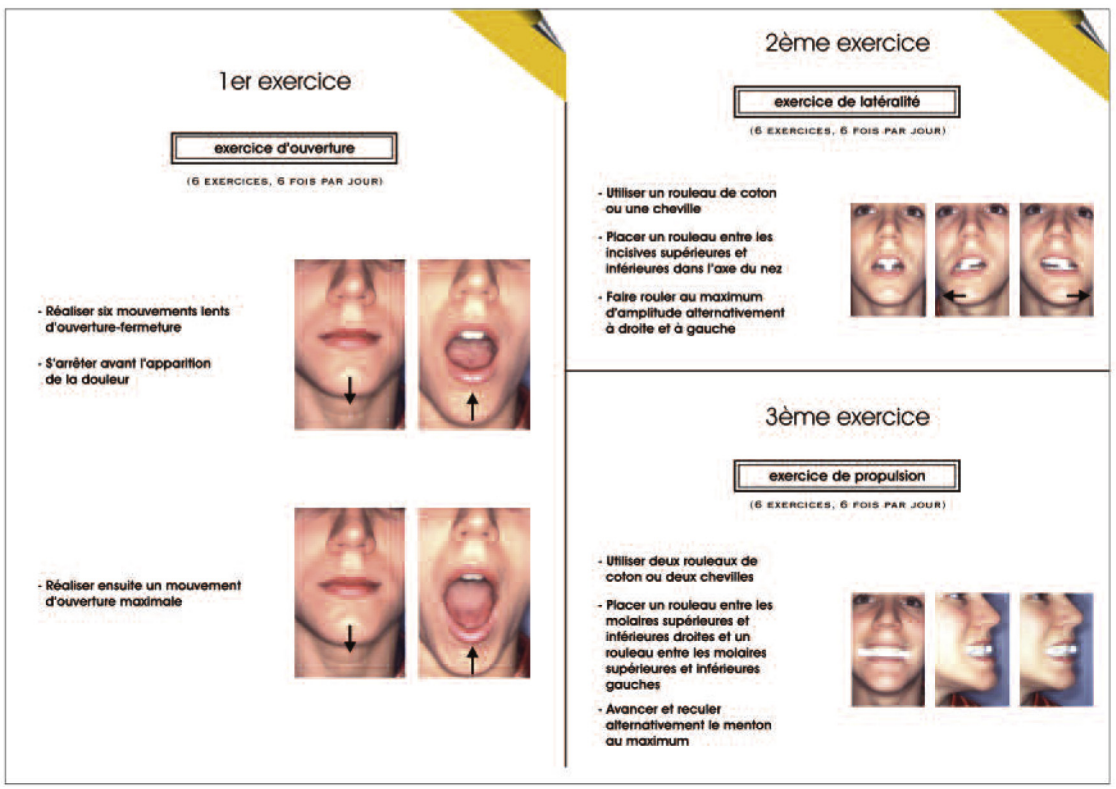
Durée ? ENVIRON 5 MINUTES

2 - posture de travail

- ASSIS(E) OU DEBOUT
- DOS PLAT
- SANS APPUI DE LA TÊTE OU DU DOS

3 - les exercices

- EXERCICES À RÉALISER LENTEMENT
- S'ARRÊTER JUSTE AVANT L'APPARITION D'UNE DOULEUR



1er exercice

exercice d'ouverture

(6 EXERCICES, 6 FOIS PAR JOUR)

- Réaliser six mouvements lents d'ouverture-fermeture
- S'arrêter avant l'apparition de la douleur

- Réaliser ensuite un mouvement d'ouverture maximale

2ème exercice

exercice de latéralité

(6 EXERCICES, 6 FOIS PAR JOUR)

- Utiliser un rouleau de coton ou une cheville
- Placer un rouleau entre les incisives supérieures et inférieures dans l'axe du nez
- Faire rouler au maximum d'amplitude alternativement à droite et à gauche

3ème exercice

exercice de propulsion

(6 EXERCICES, 6 FOIS PAR JOUR)

- Utiliser deux rouleaux de coton ou deux chevilles
- Placer un rouleau entre les molaires supérieures et inférieures droites et un rouleau entre les molaires supérieures et inférieures gauches
- Avancer et reculer alternativement le menton au maximum

Figure 13

CALENDRIER DES EXERCICES DE RENFORCEMENT

Date de début :

exercices demandés		Lu	Ma	Me	Je	Ve	Sa	Di
1ère semaine : exercices 1 - 2 - 3 - 4	matin							
	soir							
2ème semaine : exercices 1 - 2 - 3 - 4	matin							
	soir							
3ème semaine : exercices 1 - 2 - 3 - 4	matin							
	soir							
4ème semaine : exercices 1 - 2 - 3 - 4	matin							
	soir							
5ème semaine : exercices 1 - 2 - 3 - 4	matin							
	soir							
6ème semaine : exercices 1 - 2 - 3 - 4	matin							
	soir							

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EXERCICES de renforcement

1 - **préparation physique par apport de chaleur**

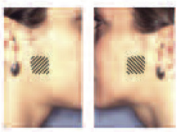
Quand ? AVANT ET APRÈS CHAQUE SÉANCE D'EXERCICES

Comment ?

☐ GANT DE TOILETTE TREMPÉ DANS DE L'EAU À 40° ☐ SÈCHE-CHEVEUX ☐ COUSSIN THERMIQUE

Où ?

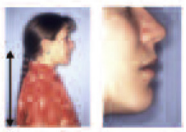
DES DEUX CÔTÉS DU VISAGE, ENTRE L'OREILLE ET L'ANGLE DE LA MANDIBULE



Durée ? ENVIRON 5 MINUTES

2 - **posture de travail**

- ASSIS(E) OU DEBOUT
- DOS PLAT
- SANS APPUI DE LA TÊTE OU DU DOS
- BOUCHE DEMI-OUVERTE



3 - **les exercices**

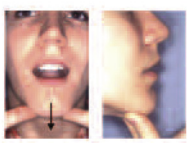
LAISSER AGIR "LE POIDS" DE LA MAIN POUR N'EXERCER QU'UNE TRÈS LÉGÈRE RÉSISTANCE

1er exercice

exercice d'ouverture

(6 EXERCICES, 6 FOIS PAR JOUR)

- Les deux pouces sous le menton
- Chercher à ouvrir légèrement la bouche
- Ressentir au niveau des muscles de la mandibule une légère résistance à l'ouverture
- Maintenir cette sensation pendant 6 secondes

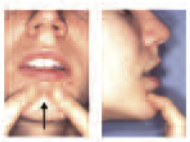


2ème exercice

exercice de fermeture

(6 EXERCICES, 6 FOIS PAR JOUR)

- Les deux pouces sur le menton
- Chercher à fermer légèrement la bouche
- Ressentir au niveau des muscles de la mandibule une légère résistance à la fermeture
- Maintenir cette sensation pendant 6 secondes

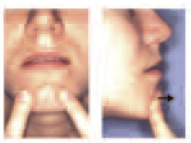


3ème exercice

exercice de propulsion

(6 EXERCICES, 6 FOIS PAR JOUR)

- Les deux index sur le menton
- Chercher à avancer légèrement le menton
- Ressentir au niveau des muscles de la mandibule une légère résistance à la propulsion
- Maintenir cette sensation pendant 6 secondes

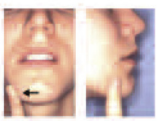


4ème exercice

exercice de latéralité

(6 EXERCICES, 6 FOIS PAR JOUR)

- L'index droit sur le côté droit du menton
- Chercher à déplacer la mandibule du côté de l'index droit
- Ressentir au niveau des muscles de la mandibule une légère résistance à ce mouvement de latéralité
- Maintenir cette sensation 6 secondes



- L'index gauche sur le côté gauche du menton
- Chercher à déplacer la mandibule du côté de l'index gauche
- Ressentir au niveau des muscles de la mandibule une légère résistance à ce mouvement de latéralité
- Maintenir cette sensation 6 secondes

Figure 14

CALENDRIER DES EXERCICES DE RECOORDINATION

Date de début :

exercices demandés		Lu	Ma	Me	Je	Ve	Sa	Di
1ère semaine : exercices 1 - 2 - 3 - 4	matin							
	soir							
2ème semaine : exercices 1 - 2 - 3 - 4	matin							
	soir							
3ème semaine : exercices 1 - 2 - 3 - 4	matin							
	soir							
4ème semaine : exercices 1 - 2 - 3 - 4	matin							
	soir							
5ème semaine : exercices 1 - 2 - 3 - 4	matin							
	soir							
6ème semaine : exercices 1 - 2 - 3 - 4	matin							
	soir							

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EXERCICES de recoordination

1 - **préparation physique par apport de chaleur**

Quand ? AVANT ET APRÈS CHAQUE SÉANCE D'EXERCICES

Comment ?

☐ GANT DE TOILETTE TREMPÉ DANS DE L'EAU À 40° ☐ SÈCHE-CHEVEUX ☐ COUSSIN THERMIQUE

Où ?

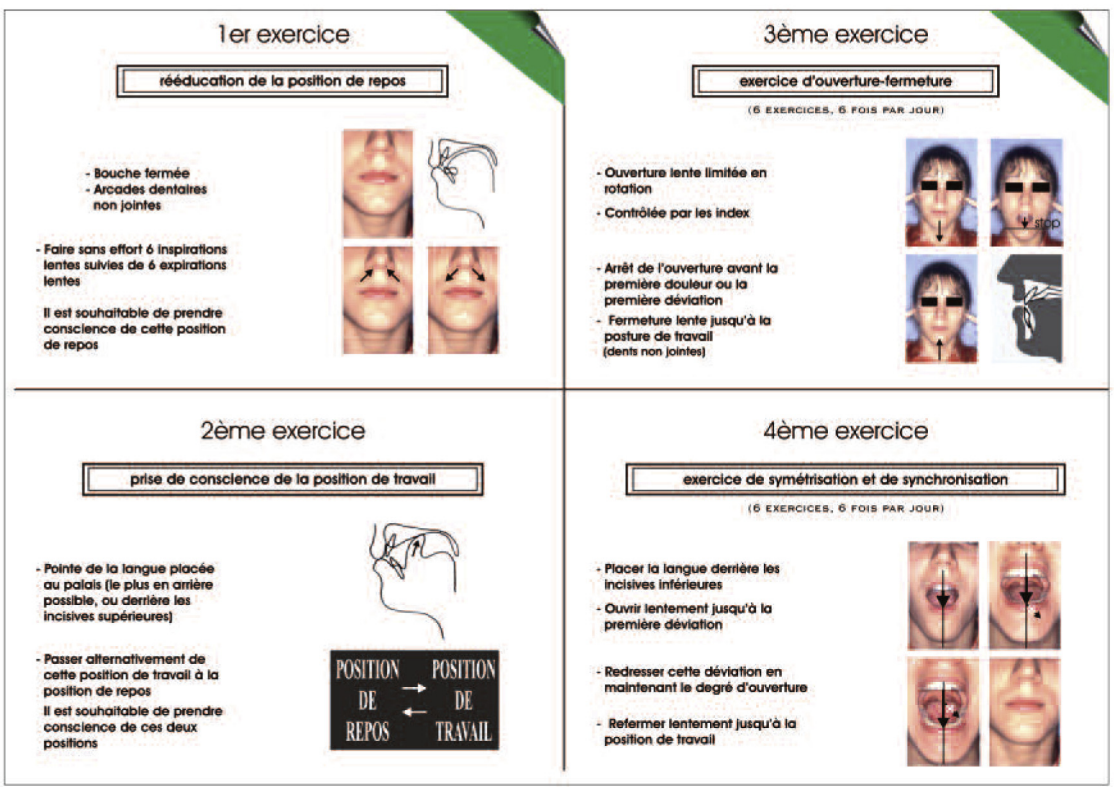
DES DEUX CÔTÉS DU VISAGE, ENTRE L'OREILLE ET L'ANGLE DE LA MANDIBULE

Durée ? ENVIRON MINUTES

2 - **posture de travail**

- ASSIS(E) DEVANT UN MIROIR VERTICAL
- TRACER UNE LIGNE VERTICALE SUR LE MIROIR
- DOS PLAT
- SANS APPUI DE LA TÊTE OU DU DOS
- LES POINTES DES INDEX SUR LES ARTICULATIONS TEMPORO-MANDIBULAIRES

3 - **les exercices**



1er exercice

rééducation de la position de repos

- Bouche fermée
- Arcades dentaires non jointes

- Faire sans effort 6 inspirations lentes suivies de 6 expirations lentes

Il est souhaitable de prendre conscience de cette position de repos

3ème exercice

exercice d'ouverture-fermeture

(6 EXERCICES, 6 FOIS PAR JOUR)

- Ouverture lente limitée en rotation
- Contrôlée par les index

- Arrêt de l'ouverture avant la première douleur ou la première déviation
- Fermeture lente jusqu'à la posture de travail (dents non jointes)

2ème exercice

prise de conscience de la position de travail

- Pointe de la langue placée au palais (le plus en arrière possible, ou derrière les incisives supérieures)

- Passer alternativement de cette position de travail à la position de repos

Il est souhaitable de prendre conscience de ces deux positions

POSITION DE REPOS → POSITION DE TRAVAIL

4ème exercice

exercice de symétrisation et de synchronisation

(6 EXERCICES, 6 FOIS PAR JOUR)

- Placer la langue derrière les incisives inférieures
- Ouvrir lentement jusqu'à la première déviation

- Redresser cette déviation en maintenant le degré d'ouverture

- Refermer lentement jusqu'à la position de travail

Figure 15

CALENDRIER DES EXERCICES DU DOS ET DU COU

Date de début :

exercices demandés		Lu	Ma	Me	Je	Ve	Sa	Di
1ère semaine : exercices 1 - 2 - 3	matin							
	soir							
2ème semaine : exercices 1 - 2 - 3	matin							
	soir							
3ème semaine : exercices 1 - 2 - 3	matin							
	soir							
4ème semaine : exercices 1 - 2 - 3	matin							
	soir							
5ème semaine : exercices 1 - 2 - 3	matin							
	soir							
6ème semaine : exercices 1 - 2 - 3	matin							
	soir							

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EXERCICES du dos et du cou

1 - préparation physique par apport de chaleur

Quand ? AVANT ET APRÈS CHAQUE SÉANCE D'EXERCICES

Comment ?

☐ GANT DE TOILETTE TREMPÉ DANS DE L'EAU À 40° ☐ SÈCHE-CHEVEUX ☐ COUSSIN THERMIQUE

Où ?

AU NIVEAU DU COU

Durée ? ENVIRON 5 MINUTES

2 - posture de travail

- ASSIS(E) OU DEBOUT
- DOS PLAT
- SANS APPUI DE LA TÊTE OU DU DOS
- MENTON RENTRÉ FAISANT UN DOUBLE MENTON

3 - les exercices

- EXERCICES À RÉALISER LENTEMENT
- S'ARRÊTER JUSTE AVANT L'APPARITION D'UNE DOULEUR

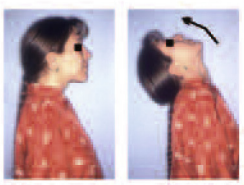
1er exercice

exercice de flexion-extension de la tête

(6 EXERCICES, 6 FOIS PAR JOUR)

- Maintenir le corps bien symétrique et la colonne vertébrale droite
- Flexion : laisser tomber la tête en avant, de son propre poids, très lentement

- Extension : redresser lentement la tête
- Laisser tomber la tête en arrière, de son propre poids, très lentement

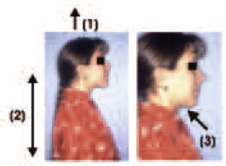


2ème exercice

exercice d'extension axiale

(6 EXERCICES, 6 FOIS PAR JOUR)

- Hisser la tête (1)
- Dans l'axe de la colonne vertébrale (2)
- En gardant le double menton (3)
- Maintenir cette position 6 secondes



3ème exercice

exercice de rotation externe des épaules

(6 EXERCICES, 6 FOIS PAR JOUR)

- Bras pendants
- les paumes des mains tournées vers l'intérieur

- Poster les épaules en arrière et en bas
- Les paumes des mains tournées vers l'extérieur
- Maintenir cette position 6 secondes

Figure 16

disorder is and how it is being treated. And they formalize the details of the roles played by each partner in the doctor-patient team.

4 – 6 – Examples of brochures used in maxillo-facial reeducation for TMD.

Among the many pamphlets available in French are documents written by D and G Rozencweig[38], J. D. Orthlieb; and C. Pianello[33] (one that can be downloaded from the site of the *Collège National d'Occlusodontologie* [5]).

In our daily practice we use brochures on maxillo-facial reeducation from the University Department of Occlusodontia Paris V[16] (Fig 13 to 16) that are recommendations taken from brochures of C. Pianello to which we have appended didactic illustrations. But we are now developing new, more multi-facetted brochures that specifically adapted to orthodontic practice.

[5] http:/www.occluso.com/excercise.pdf

5 – CONCLUSION

The management of TMD treatment by means of maxillo-facial re-education is a simple, conservative, and reversible therapeutic modality whose evidence based utilization is amply justified by a large consensus in the scientific literature[35].

Clinicians can reinforce the effectiveness of maxillofacial re-education by adapting it to the needs and desires of individual patients by planning steps of their therapeutic education especially suited to their requirements.

This medical approach, similar to those employed by physicians for treating other joints of the human musculo-skeletal system, is readily available to all practitioners and enables them to respond simply and effectively to all clinical situations[9]. With it clinicians can help patients with temporo-mandibular disorders to make adjustments that will relieve their pain and regain functional comfort.

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