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Contribution of a Muscle Relaxation-Based Training Protocol to alleviate Nicotine Dependency in Two cases of smoking addicts

Bourouba Amel[1], Kettaf Rezki[2]

[1,2] University Setif -2- (Algeria).

The Autor's E-mail: a.bourouba@univ-setif2.dz[1], r.kettaf@univ-setif2.dz[2].

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Abstract:

This study aims to verify the contribution of a training protocol based on muscle relaxation techniques in teaching and equipping individuals addicted to smoking with skills and experiences on how to control their bodies and cope with stress and tension, thereby managing strong cravings. This is achieved through fundamental mechanisms that involve body relaxation, also known as attunement to the body (listening to the body) through muscle group activities, followed by mental focus on the distinction between the neuromuscular tension and relaxation process, with the primary driver being suggestive language...

The clinical approach was relied upon based on a case study of two smoking addicts, by measuring the initial level of Physiological dependence on nicotine. Subsequently, measurements were taken at two different periods, the first after three (03) months of applying the training protocol, and the second after a period of six (06) months.

The study tools included: semi-structured clinical interview, semiotic observation, and the Fagerström Nicotine Physical Dependency Scale (2012). Following that, the muscle relaxation-based training protocol, inspired by the Jacobson and Öst models (developed by the researchers), was applied, consisting of ten (10) sessions, with one session per week...

The results of this study indicated the contribution of this proposed muscle relaxation model in alleviating the physiological nicotine dependency in the two study cases.

Keywords: Smoking, Nicotine, Muscle Relaxation, Body Relaxation, Mental Focus, Suggestive Language.

- Introduction / Problem Statement:

Smoking is one of the most serious psychological and social problems that has escalated in society in the 21st century, affecting individuals of various social levels and age groups. It is a socially accepted behavior, unlike other types of drug substances. As one psychologist in the field expressed, smoking entices many individuals, symbolizing masculinity for adult males, entry into

the adult world for children and adolescents, a symbol of equality with men, and a sign of civilization and progress for women.

In this context, the Minister of Health, Population, and Hospital Reform emphasized that Algeria is at risk of nicotine addiction, given the prevalence rate that reached 16.2 % in 2017 among individuals aged 18 to 74 **(Algerian News Agency, June 2021)**. These statistics are from six years ago, so what are the current expectations?

smoking is a self-choice behavior, comes with health, economic, and social consequences, especially within the family and professional environments. However, those addicted to smoking often find it challenging to quit or abstain from cigarettes. What exacerbates the problem is that addiction to smoking is often associated with other forms of addiction, such as alcohol and drugs.

Indeed, smokers are more inclined to engage in unhealthy behaviors. Smoking and alcohol consumption often go hand in hand. It also appears that drinking alcohol acts as a pretext that leads to smoking and makes stopping it more difficult. Smokers are more prone to accidents and workplace injuries, making them a costlier workforce for employers. Smoking can also serve as a gateway to experimenting with substances and drug abuse, as trying cigarettes may make individuals to be more inclined to use other types of drugs in the future. **(Taylor, p. 259)**

It is evident that smoking is an addictive behavior that is difficult to quit or stop, primarily due to the potent impact of nicotine found in tobacco cigarettes.

In the same context, many researchers have affirmed that quitting smoking is harder compared to other forms of addiction. This is because the body becomes accustomed to nicotine, leading to its continued use, and individuals find it challenging to alter the nicotine levels in their blood. This, in turn, affects the fluctuation of active neural regulators that play a crucial role in maintaining an individual's performance, skills, and overall psychological responses. **(Quertement & Bartsch, 2020)**

Additionally, attempting to quit smoking, whether voluntarily or involuntarily, induces feelings of tension, nervousness, and agitation. Smokers may resist hunger and thirst for extended periods, yet they struggle to abstain from smoking for even short durations. **(Aldanshari, 1987, p. 58)**

It is evident that smoking is subject to addiction factor associated with nicotine, making it challenging to treat. One of the major difficulties in treating smoking addiction is the occurrence of relapses, where individuals face the same environmental conditions that led them to smoke in the first place.

Several medical interventions have been introduced, but they alone are often insufficient to help smokers quit. Psychologists have increasingly turned to behavioral and cognitive approaches

to address smoking addiction, which have actually proven their effectiveness. One such protocol, proposed by Philippe Guichenez in 2017, is based on cognitive-behavioral therapy and consists of four stages: therapeutic intervention, functional analysis, cognitive-behavioral techniques, and assessment. This protocol has proven effective in smoking cessation. **(Guichenez, 2017)**

Many other studies have confirmed that smokers who participate in specialized smoking cessation programs still face challenges. Estimates suggest that only half of them succeed in abstaining from smoking after completing these programs. The highest success rates are observed among smokers with higher educational levels, older age, and severe health issues. **(Kring, 2017, p. 632)**

It's noteworthy that many psychological treatments, although different, have shown promising results in gradually reducing nicotine levels in the smoker, with many adopting cognitive-behavioral approaches. However, it's worth mentioning that we have not come across programs that specifically utilize relaxation techniques, particularly muscle relaxation. Therefore, our focus in this study is on this aspect. Since smokers are often controlled by intense cravings resulting from nicotine addiction which increases the difficulty of quitting or stopping smoking, and eventually, experiencing unbearable withdrawal symptoms. Relaxation techniques can equip them with skills to control their bodies and manage overpowering urges.

Based on the above, the main research question revolves around the following:

Does a training protocol based on muscle relaxation techniques contribute to alleviating nicotine dependency in smokers?

- General Hypothesis:

A training protocol based on muscle relaxation techniques contributes to alleviating nicotine dependency in smokers.

- Study Objectives:

1. Measuring the level of nicotine in the body of individuals addicted to smoking.

2. Determining and confirming the contribution of a muscle relaxation-based protocol, inspired by Jacobson and Öst's methods, in alleviating the physiological nicotine dependency in smokers.

- Importance of the Study:

- Theoretical Significance: This study holds particular importance as it is one of the rare Arabic, and specifically Algerian, studies that focus on designing muscle relaxation protocols based on Jacobson and Öst's cognitive-behavioral strategies to alleviate physical nicotine

dependency in individuals addicted to smoking. This represents a modern approach that relies primarily on a series of physical exercises and cognitive techniques.

- Practical Significance: The current study aims to contribute to enriching a vital aspect of clinical psychology by presenting a muscle relaxation protocol to alleviate physiological nicotine dependency in individuals addicted to smoking where it can be utilized by specialized practitioners.

- Study Terminology and Concepts:

1. Smoking:

- In Arabic, smoking is the noun of the verb to smoke. It is defined as an action where a person smokes a prepared substance by inhaling it vigorously to exhale white smoke from their mouth and nostrils. **(Dardar, 2001, p. 17)**

- As a term, it is defined as the process of burning a substance, often tobacco, followed by tasting or inhaling the smoke. This involves the combustion of the active substance in the drug, such as nicotine, making it available for absorption through the lungs. Thousands of chemicals that affect the central nervous system are released through the burning of the active substance, making it available for absorption through the lungs. Cigarettes, whether industrially produced or hand-rolled from loose tobacco and cigarette rolling papers, is the most common means of smoking today. Other means of smoking are pipes, cigars, hookahs, and bongs. **(Ghanem, 2006, p. 36)**

- It can also be defined as the process of inhaling smoke, vapors, toxins, burnt materials, and carbon monoxide produced by the combustion of tobacco directly.

Chemists define smoking as the process of sufficient distillation of tobacco, which produces various substances such as: nicotine, ammonia, carbon monoxide, volatile oils and other dangerous substances, and that the smoke of one cigarette contains 400 harmful chemicals. **(Shah, Bouabdallah & Tara, 2020, p. 21)**

In summary, smoking is an accumulative effect on the smoker's body resulting from the combustion of tobacco. Addiction to this substance increases day by day, making it difficult to quit. The harm from this consumption stops depending on the duration of smoking (since most smokers start at a young age), the number of cigarettes consumed daily, the smoking method, and the smoker's overall health.

2. Nicotine:

- Nicotine is a toxic, colorless, and transparent chemical substance found in tobacco, which is cultivated for cigarette production. Cigarettes contain around 400 chemical substances, including 100 toxic compounds and 63 carcinogenic substances.

- Nicotine is one of the most toxic components found in cigarettes. It is a chemical substance with an oily texture that quickly enters the body. Nicotine affects the brain similarly to stimulants and drugs. It leads to a decrease in the amount of oxygen in the blood in the legs, feet, and body tissues.

- Nicotine in cigarettes causes severe addiction by inducing feelings of euphoria through stimulating brain cells. It initially produces a sense of relaxation, which later develops into a feeling of numbness and calmness. Therefore, refraining from smoking can lead to nervous and mood disorders, along with anxiety. **(Shah, Bouabdallah, & Tara, 2020, p. 27)**

3. Muscle Relaxation:

- Before delving into the procedural definition of muscle relaxation in this study, it is essential to mention its foundation, which relies on the techniques of both Jacobson and Öst:

3.1. American researcher Edmond Jacobson was the first to emphasize muscle relaxation in 1940. He highlighted the simple physiological relationship between muscle tension and mental tension. In his book "You Must Relax" in 1957, Jacobson proposed progressive relaxation (or systematic relaxation) of all muscles in the body. Jacobson's method directly stems from the physiological studies of the neuromuscular system. He initially studied the problems of emotional reactions and nerve irritation.

Based on the results of Fouillée's in France, regarding involuntary twitches in humans, Jacobson noticed that individuals tend to react more easily when they are tense, whereas if a person feels relaxed and calm, they do not react at all. Consequently, no nervous disturbance of any kind occurs. Moreover, all muscle fibers are in a state of relaxation accompanied by a lack of any nervous impulse.

The progressive relaxation method is based on the practice of creating tension in the muscle and closely observing three sensations:

- Provoked Tension (La tension provoquée).

- Auxiliary Tensions (Les tensions annexes).

- Progressive Relaxation (Le relâchements progressif).

Simply observing one's own muscle relaxation leads to relaxation. **(Guiose, 2004, p. 10), (Hainbuch, 2007)**

This method consists of several stages, with the initial stage being purely muscular, while the later stages lead patients to "mental relaxation." The first stage of muscle training begins with the muscles of the hands, arms, legs, abdomen, back, chest, shoulders, neck, face, and finally the entire body... **(Servant, 2011, p.2)**

What distinguishes Jacobson's method is that the individual first becomes aware of muscle tension and then trains their cognitive abilities accordingly. This self-awareness is not found in other relaxation techniques and typically takes about twenty (20) minutes to progressively relax the muscles. Muscle contraction is followed by muscle relaxation, with the relaxation phase needing to last longer than the contraction. **(Bourouba, 2017)**

2.3. As for the Öst method, it is a set of techniques proposed by the psychologist Lars Gören Öst and is also known as Applied Muscle Relaxation (1987). It is inspired by the fundamental principles of Jacobson's progressive muscle relaxation, teaching individuals to relax in consecutive, short periods so they can apply these techniques in their daily lives. It achieves muscle relaxation through alternating muscle contraction and relaxation within a muscle group based on a structured protocol. Öst's techniques consist of six (06) stages:

1. Contraction/ relaxation (La contraction/ décontraction).

2. Relaxation only (La décontraction seule).

3. Conditioned relaxation or signal-controlled relaxation (La relaxation conditionnée ou contrôlée par le signal).

4. Differential relaxation (La relaxation différentielle).

5. Rapid relaxation (La relaxation rapide).

6. Training for application (L'entrainement à l'application).

Öst believes that using contraction and relaxation can achieve a state of relaxation in 15-20 minutes, while relaxation alone takes 05-07 minutes. In the conditioned relaxation stage, relaxation can be achieved in 02-03 minutes, and differential relaxation in 60-90 seconds. Rapid relaxation can be achieved in 20-30 seconds. This is done through practical sessions ranging from 8 to 12 sessions, along with daily home training sessions in separate intervals, which Öst considers crucial in the therapeutic program. **(Bourouba, 2017)**

Öst emphasizes that this relaxation method is applied in a seated position as he believes that all manifestations occur in this position, as opposed to the extended position.

- Tightening/ Relaxation: Contraction and relaxation occur in various muscle groups. The first session focuses on the upper part of the body, while the second session includes the entire

body by integrating the lower part into the original training. The sensation of tightening lasts for 05 seconds, while the sensation of relaxation lasts for 10-15 seconds. To relax the upper part of the body, the instructor's instructions focus on choosing descriptive words that are repeated sequentially starting from the hands, then the arms, face, neck, and shoulders. For example, in the first exercise, tightening the grip of the right hand and focusing on the pressure sensation, then releasing that grip and focusing on the sensation of relaxation. The instruction might be as follows: "Tighten the grip of your right hand for a few seconds, then relax and focus on the sensation of relaxation, and be aware of the difference between the processes of tightening and relaxation in your hand muscles, even in your forearm."

- Relaxation Only: To reduce the time for introspection, the instructor focuses directly on relaxation instructions, which might involve relaxing the grip of the hand, for example. The session begins with a focus on breathing and respiratory movements to facilitate attention to various muscle groups, starting with the hand grip and extending to the feet.

- Signal-Controlled Relaxation: To further reduce the time required for introspection and facilitate relaxation training, the instructor also focuses directly on incorporating relaxation instructions with words like "relax," along with repetitive exercises accompanied by organized and slow deep breathing.

- Differential Relaxation: This stage marks the most active and vibrant phase where participants are active and positive. The goal here is to achieve relaxation in parts of the body that have not participated in previous activities, utilizing the economy of ineffective tension. It starts with exercises in a sitting position involving simple hand or arm movements and then exercises in a standing position, where the participant focuses on contracted parts and relaxes the muscles not involved in the activity. For example:

- "Take a pen and press it firmly, then slowly write your name and address on a piece of paper. You will feel the friction of your fingers and the contraction of your hand extending from the wrist to the elbow."

- "Focus on this sensation."

- "Now, examine the opposite hand and arm to see if your body is relaxing well.

- If you feel that your opposite arm is tense to your body and your toes are curled, relax the rest of the untrained body."

- Rapid Relaxation: After this exercise, the participant applies differential relaxation in a sitting position and then while walking. It begins by relaxing facial muscles or the hand grip that was not involved, and then focuses on various unnecessary muscle tensions and works on relaxing them.

- Training for Application: This is achieved through the regular and continuous implementation of the described procedure within and outside the programmed sessions. **(Servant, 2011, pp. 2-5), (Précart, 2016, pp. 87-89)**

As for the procedural definition of muscle relaxation in this study, it is as follows:

General relaxation is the complete cessation of all neuromuscular contractions and spasms to activate the individual for the purpose of achieving muscular and mental tension relaxation. In this study, it is a type of body-centered psychotherapy, where the supine position is chosen as a means of expression through simple and repeatable exercises to teach individuals addicted to smoking how to control their bodies, thus managing strong cravings.

It is a state of overall physical and mental tranquility that includes three levels of relaxation: muscular, respiratory, and mental, using suggestive language executed through a series of physical exercises (training each muscle group separately) and psychological techniques (mental focus to differentiate between tension and relaxation processes and describing sensations).

- Study Methodology:

The choice of methodology is linked to the nature and characteristics of the studied phenomenon, data collection methods, and study tools. Based on these considerations, the adopted methodology in this study, with its wide scope and procedural aspects, is the clinical case study methodology. This methodology was imposed by the nature of the subject, as it involves diagnosing two case studies by measuring the physiological addiction level to nicotine substance in two individuals addicted to smoking. The study involves applying a protocol based on muscle relaxation techniques through tension and relaxation which occur through three main phases: induced tension, associated tensions, and gradual relaxation. Subsequently, the study ensures the contribution of this protocol through a post-measurement, followed by reapplying the measurement tool during follow-up, which occurs in two consecutive periods: three months (03) after the post-measurement and then six months (06) later.

- Case Studies and Their Characteristics:

Table 1 illustrates the characteristics of the two case studies

Study cases	Gender	Age	Educational level	Smoking onset
Case 1 (M)	male	40	Elementary	Since age 12
Case 2 (E)	male	37	University	Since age 15

- Study Tools:

1. Clinical Interview:

Clinical interview is a technique based primarily on verbal information. It is one of the most important means used in scientific research to collect precise and specific data. It is particularly valuable in clinical or academic research, as in this clinical study.

In this regard, both researchers Grawitz & Pinto pointed out that clinical interviews are selected for two criteria: to the degree of depth in the discussion or to the accuracy of the information researched. **(Al-Qahtani, 2013, p. 8)**

The interviews in this study were semi-structured and serve two main purposes:

- ✓ The diagnostic interface, aimed at understanding smoking addiction at all stages, from its inception to consumption patterns and responses to this addiction to cigarettes, and most importantly, assessing the physiological addiction level to nicotine in the bodies of the study subjects.
- ✓ The therapeutic interface involves applying the protocol based on muscle relaxation techniques.

These interviews include a set of sub-axes, all serving the main axis, which is diagnosing the physiological addiction level to nicotine in the bodies of the study subjects.

The diagnostic interview axes were as follows:

1. The first axis: The initiation of smoking and describing the signals and situations that lead to smoking. For example, during daily activities, in leisure times, when feeling bored, or in cases of exposure to daily life pressures and frustration, …etc.

2. The second axis: Describing the excitement or what is known as the smoking environment, including being in the company of smokers, sitting near places where cigarettes are sold, and having support, whether from family or external sources, for quitting smoking.

3. The third axis: Emotional expressions in the absence of cigarettes and during smoking.

4. The fourth axis: Physiological responses in the absence of cigarettes and during smoking.

5. The fifth axis: Psychological manifestations in the absence of cigarettes and during smoking.

6. The sixth axis: Measuring the level of physiological addiction to nicotine in the body and describing attempts to quit if applicable.

7. The seventh axis: Internal insight into the health, economic, and social consequences of smoking.

2. Semiotic Observation:

To gain a broader understanding of the smoking behavior of the study subjects, we decided to use direct observation objectively on-site during the diagnostic interviews conducted individually with each case. This was especially important during the examination process, where the main goal was to assess or rather measure the level of physiological addiction to nicotine in the body and the motivation to apply the relaxation protocol based on muscle relaxation techniques.

Additionally, direct observation was also used during the application of the relaxation training protocol. This involved observing the physical experience and accompanying emotional expressions, particularly in the initial preparatory phase aimed at learning the positions and techniques of muscle relaxation. Observation helped ensure the correct posture, monitor reactions to the training itself, and understand the presented suggestive language, among other aspects. These observations were recorded during the initial and second sessions. Direct observation continued during the relaxation training application, recording the physical experience and accompanying emotional expressions, especially during the assessment sessions (ninth and tenth sessions). In essence, it involved observing and describing the situation for this training experience, commonly referred to as feedback.

So, direct observation, in collaboration with the clinical interviews, was implicit both during the clinic interviews themselves and during the application of the training protocol.

3. Fagerström Test for Nicotine Dependence:

The Fagerström Test is a scale that measures the physiological (physical) addiction to nicotine in a smoker. It consists of 6 items, and each item has response options, with each option assigned a score ranging from 0 to 4. The total score determines the degree of addiction.

This scale was initially designed by Fagerström in 1978. It originally contained eight questions but was modified by Heatherton in 1991, where two questions were removed and replaced with two others. It was then named the Nicotine Dependence Scale. In 2012, the name was changed to the Smoking Dependence Scale without changing the content of the items. **(Heatherton TF: 1991, p19)**

Scoring for the test is as follows:

- 0 to 2: No addiction or dependence.

- 3 to 4: Weak dependence.

- 5: Moderate dependence.

- 6 to 7: Strong dependence.

- 7 to 8: Very strong dependence.

4. The Training Protocol Based on Muscle Relaxation Techniques to Alleviate Nicotine Dependence in Smokers:

It is a designed program based on muscle relaxation techniques inspired by Jacobson and Öst to alleviate nicotine dependence in smokers. It is implemented individually through a series of physical exercises (training each muscle group individually) and psychological methods (mental focus during the muscle tightening-relaxation process, describing sensations and emotions, and providing feedback).

It consists of ten (10) sessions, with the first two sessions dedicated to an introductory review. Sessions three to eight cover relaxation training, while sessions nine and ten are specifically for evaluating all previous sessions. Each session has general and specific objectives, means, and training content.

These sessions are distributed weekly, with varying durations ranging from 45 to 56 minutes depending on the session's content and the smoker's ability to achieve the correct training posture. Each session includes two (02) overlapping fundamental periods, which are not rigidly organized. These periods are as follows:

- ✓ The first period: Physical strategies.
- ✓ The second period: Emotional strategies.

The physical strategies involve training each muscle group individually, as outlined in the following table, while the emotional strategies, within this muscle relaxation protocol, focus on describing sensations, feelings, emotions, and reactions, also known as psychological responses in smokers. The aim is to guide these responses positively in controlling the body, managing stress, and ultimately dealing with strong cravings that hinder self-control and weaken self-confidence, while also reducing awareness and insight into situations in compliance with those dominant desires.

The training protocol based on muscle relaxation techniques to alleviate nicotine dependence in smokers relies on three (03) fundamental mechanisms:

- Body Relaxation (La détente corporelle): This mechanism involves using techniques that promote muscle relaxation, often referred to as listening to the body as Jean Bergès states it through muscle group activities **(Bourouba, 2017)**. Language suggestive of the body is the driver here (**Le Langage Suggestif)**. In this context, language and the body operate on the same level to

bring about transformations and changes. This work gives presence to the body, leading to the construction of its representations by recalling and retrieving mental images, concepts, events, and situations.

In other words, it can be said that this is a process of suggestion, where one person influences another. Bernheim emphasizes that suggestion often refers to a word, sign, or information used to influence others.

Freud pointed out that suggestion is the primary phenomenon that cannot be entirely ignored as it is the fundamental reality of an individual's psychological life. Suggestion can be induced by the individual themselves or by others through various sensory methods, including imaginative and emotional aspects. It can be direct or indirect, immediate or delayed. **(Benoit, 2001, p. 3)**

Then Mental Focus **(La concentration mentale):** the process of concentration is essential throughout the relaxation session and in all the programmed sessions. During these sessions, focus is directed toward the body, distinguishing between the processes of tension and relaxation, and on imaginative activity. **(Bounes & Bonnet, 2008, pp. 6-7)**

Table 2 illustrates the procedures of the training protocol based on muscle relaxation techniques to alleviate nicotine dependence in smokers.

Session number	Session topic	Session goal	Technologies used	Session time	Evaluation
First session	Introductory session	Learn and acquire how to tighten and relax the arm muscles	1- Abdominal breathing and arm muscle training	45 m	- Building a trust relationship (examiner-examinee). - Correction non-relaxation postures. - Correcting misunderstandings about performance and instructions. - Description the experiences (Mental Imagery).
Second session (Pre-	Introductory session	Learn and acquire how to tighten	2- Abdominal breathing and arm muscle	47 m	- Reassessing understanding of training, instructions, and the difference between

measurement of the case's level of nicotine dependency)		and relax the arm muscles	training		tightening and relaxation.
Third session	Relaxation training	Learn and acquire how to tighten and relax the hands' muscles.	3- Abdominal breathing and hand muscle training	50 m	- Recording Smoking Times and Conditions before Starting the training. - Describing sensations and emotions after the training.
Fourth session	Relaxation training	Learn and acquire how to tighten and relax the arm muscles	4- Abdominal breathing and arm muscle training	51 m	Before starting the training, setting a specific quitting or reduction date with the specialist to quit or reduce the number of cigarettes consumed daily, with the possibility of using nicotine patches or gum. -After training, describing sensations and emotions.
Fifth session	Relaxation training	Learn and acquire how to tighten and relax facial muscles	5- The process of abdominal breathing and training of the facial muscles: the forehead, the eyes	52 m	- After training, describing sensations and emotions experienced during the session. - Highlighting the differences in situations and experiences before and after quitting or reducing smoking. Choosing the healthier situation with inference.
Sixth session	Relaxation training	Learn and acquire how to tighten and relax facial muscles	6- The process of abdominal breathing and training of the facial	53 m	- Before the training, creating a list of guidelines to avoid environments that trigger smoking or habitual settings. - Describing Sensations and

			muscles: jaws, mouth		Emotions after the training.
Seventh session	Relaxation training	Learn and acquire how to tighten and relax the shoulder muscles	7- Abdominal breathing and shoulder muscle training	54 m	-After training, describing experienced sensations and emotions. - Describing the motives for moving to the next stage (quitting or reducing consumption).
Eighth session	Relaxation training	Learn and acquire how to tighten and relax the leg muscles	8- Abdominal breathing and leg muscle training	56 m	-After training, describing sensations and emotions. - Describing current experiences and situations after successfully quitting or reducing the daily cigarette intake.
Ninth session (Post-measurement of the case's level of nicotine dependency)	Evaluation and follow-up	Evaluation of relaxation sessions	9- Abdominal breathing process/ recalling sessions	48 m	- Assessing the individual's ability to achieve proper airway relaxation and practice deep, healthy breathing instead of shallow chest breathing. - Evaluating the examinee's ability to control overpowering cravings and responses to tobacco.
Tenth session	Evaluation and follow-up	Evaluation of relaxation sessions	10- Abdominal breathing process/ recalling sessions	48 m	- Evaluating the examinee's self-awareness and insights after transitioning from nicotine addiction to quitting or reducing tobacco use.

Discussion of the Study Results in Light of the General Hypothesis, Study Tools, and Application of the Training Protocol:

- Case Study 1:

This concerns Mr. "M," a 40-year-old man currently working in a private company in the industrial area of Setif (with a somewhat low monthly income). His educational level has not exceeded elementary school. He is married and a father of two daughters, residing with his extended family in the Tanger neighborhood, one of the popular districts in the state. He was interviewed and taken care of at the level of the psychological clinic at the Community Health Facility in Setif (the practice's headquarters).

Case 1 was referred to the psychological clinic based on the guidance of an endocrinologist specializing in thyroid and diabetes, as he has been suffering from type 2 diabetes for about five (05) years. After several personal attempts to quit smoking, all of which ended in failure, he finally decided to seek assistance from the clinical psychologist.

Despite his continuous hesitation, "M" showed responsiveness and acceptance of this guidance, examination, and motivation to quit smoking. In a soft-spoken tone, he answered all the interview questions fluently. He stated that he began smoking at an early age, around the age of twelve (12). At that time, he enjoyed stealing cigarettes from his uncle and father and would consume them with friends (group smoking). According to his statement, he currently smokes daily, depending on his mood, approximately 25 to 30 cigarettes, which is equivalent to two packs a day.

After agreeing on the therapeutic contract and how to apply the muscle relaxation-based training protocol, a series of videos related to real-life stories of some smokers and the effects on their health and how they were treated in various international clinics were presented. Some of them suffered from lung cancer, others from heart diseases, and others had various deformities and lung infections. This is known as the modeling strategy to encourage and motivate him further to apply the protocol and continue his sessions.

In general, Mr. "M" was consistent in attending his training sessions regularly, and gradual improvement was observed with each session, leading to a reduction in smoking consumption. In other words, a reduction in nicotine dependence in the body. The results of the pre-test, post-test, and follow-up test were as follows:

Table 3 illustrates the results of the Fagerström scale for nicotine physical dependence in the pre-test, post-test, and follow-up for Case Study 1.

Pre-measurement	**Post-measurement**	**Follow-up measurement**	
7 (indicating strong dependency)	3 (indicating a weak dependency)	**After 03 months of post-measurement**	**After 06 months of the first follow-up**
		1 (indicating lack of	1 (indicating lack of

	dependency)	dependency)

As shown in the table above and compared to the results of the pre- and post-measurement, as well as the follow-up measurement, which took place over two successive periods (the first period after 3 months of the post-measurement, while the second period after 6 months of the first follow-up measurement) for the Fagerström Scale for Physical Dependence on Nicotine in case study 1, the results confirms the achievement of the general hypothesis, which states that: **"A training protocol based on muscle relaxation techniques contributes to alleviating nicotine dependence among smokers"**. Additionally, the training protocol had a positive and lasting impact on reducing nicotine dependence.

- Case Study 2:

The second case, also seen and treated at the psychological clinic of the Community Health Facility in Setif, is Mr. "E," a 37-year-old single man who occasionally helps his father in his grocery store. He holds a bachelor's degree (Master's in Accounting) and comes from a family with a reasonably good economic status.

Mr. "E" voluntarily presented himself to the psychological clinic after making a firm decision driven by the deterioration of his health. He constantly experiences symptoms such as headaches, dizziness (Les vertiges), and fatigue despite not engaging in any physical exertion. He also suffers from insomnia, increased anxiety, and tension, especially as he recently started reducing the number of cigarettes he smokes daily. All these symptoms are considered normal withdrawal symptoms experienced by smokers when they reduce or quit smoking.

He mentioned that he started smoking at a relatively young age, around fifteen (15), and typically smoked in a group with his friends. His average daily consumption was approximately 3 packs, but with recent reductions, he has lowered it to two packs a day.

Following the agreement on the therapeutic contract and using the same procedures applied to Case 1, the training protocol was implemented.

Mr. "E" also showed readiness and motivation to reduce the quantity of cigarettes consumed, making progress during all ten sessions. Similar to Case 1, a reduction in nicotine levels in Mr. "E's" body was observed at the end of the training sessions. The results of the pre-test, post-test, and follow-up were as follows:

Table 4 illustrates the results of the Fagerstrom Physical Dependence Scale to Nicotine in the pre- and post-measurements and follow-up for case study 2.

Pre-measurement	Post measurement	Follow-up measurement

8 (Indicating a very strong dependency)	4 (indicating weak dependency)	**After 03 months of post-measurement**	**After 06 months of the first follow-up**
		1 (indicating lack of dependency)	2 (indicating lack of dependency)

As shown in the table above and comparing the results of the pre-test, post-test, and the two consecutive follow-up measurements for the Fagerström scale for nicotine physical dependence in Case Study 2, it is clear that the general hypothesis, which states, **"A training protocol based on muscle relaxation techniques contributes to reducing nicotine dependence in smokers,"** has been achieved. The results also confirm the continued contribution of this protocol, as demonstrated by the follow-up measurements for Case 2.

After diagnosing nicotine dependence in both case studies and intervening through the application of the training protocol based on muscle relaxation techniques (including self-help interventions), a decrease in nicotine levels was observed in both cases. This indicates a reduction in cigarette consumption and stability, and even quitting smoking (cessation of dependence) in both cases. These findings are further supported by the results of the consecutive follow-up measurements.

Numerous therapeutic interventions, somewhat different from the current protocol, have also demonstrated their effectiveness. For example, a study by Iman Saddaka (2022) showed the effectiveness of a treatment plan based on hidden sensitization in reducing smoking behavior among a sample of school-going adolescents. This was demonstrated through statistical significance and practical significance, expressed through Cohen's effect size criteria and clinical significance using Jacobson's stability index. **(Saddaka, 2022)**

Additionally, a study by Mohamed Fouad Foudil (2010) confirmed the effectiveness of the Rational Emotive Behavior Counseling (REBC) approach when applied to a group of male smokers who held favorable attitudes and beliefs toward smoking and drugs. The study aimed to modify these irrational attitudes and beliefs into more rational ones. **(Foudil, 2010)**

Conclusion:

The awareness and understanding of an individual regarding the health risks associated with smoking, along with an increase in motivation or, more precisely, motivation, are two key factors that contribute to accepting therapeutic interventions aimed at reducing the number of cigarettes smoked daily, and ultimately achieving gradual cessation. This is precisely what the current study has demonstrated, which stated: "A training protocol based on muscle relaxation techniques contributes to alleviating nicotine addiction in smokers." Gradual cessation results from the body's adaptation to the absence of nicotine, as the components of nicotine are

responsible for continuous addiction, habituation, and dependence, making it challenging for individuals to quit smoking.

Smokers often experience withdrawal symptoms when attempting to reduce or quit smoking. These symptoms include feelings of hopelessness, insomnia, instability, headaches, decreased self-confidence, heightened emotions, anxiety, and tension. Upon closer examination, it becomes clear that these reactions are primarily psychological in nature, with a significant impact on an individual's physiological functions through the dynamics of the nervous system. Therefore, the implementation of a training program based on muscle relaxation exercises effectively alters the functional energy of the nervous system in the same manner.

Recommendations:

The most significant recommendation arising from this study is the training and qualification of professionals in the clinical psychology field to utilize relaxation techniques as effective methods for smoking cessation.

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