IMMERSIVE
ADDICTION
REHABILITATION

SUMMARY

• Introduction

a. Warning

C2Care's virtual environments should not be used outright with a patient in abstinence or suffering from another addiction, as it risks sensitizing them and provoking a relapse. They should be utilized once the patient is prepared and trained in therapy (CBT: cognitive-behavioral therapy, psychoanalysis, relaxation, emotion management, etc.). The therapeutic aim is to expose the patient to virtual environments containing situations generally at risk of consumption so that they can apply therapeutic tools in the reality of their daily life, and this for the purpose of managing their desire for consumption (craving).

b. Integration of CBT

This manual for professionals aims to assist you in integrating Virtual Reality Exposure Therapy (VRET) into your cognitive-behavioral therapy (CBT) practice. It will detail the general principles, a comprehensive method, and the different stages of therapy in the following chapters.

• Format

1 weekly session of about 40 to 50 minutes at the hospital or in private practice.
A total of 8 to 12 sessions, equating to 2 to 4 months of treatment.
A spaced follow-up with an interview every 3 months during the first year after therapy ends is possible to ensure the maintenance of benefits obtained and to address any questions that exposure in reality may have raised.
Regarding its use in psychoanalysis, the number of sessions is at the discretion of the therapist, who must choose between the possibility of a transfer before exposure or the revelation of repressed drives, forgotten traumas, or misplaced fears during the exposure in virtual reality.

Primum non nocere: The goal of the treatment is the patient's emancipation, not to make them dependent on the therapist. The patient is an adult who must stand on their own two feet. Your role is not to confine them in a therapy that will last years. Your role is to give back the wings they so desperately seek to rise and thrive, enjoying the full potential of their personality and own abilities. The first 4-5

sessions are dedicated to learning relaxation, cognitive therapy, and managing the urge to consume or craving (which will be detailed in this manual), and the subsequent 4 to 10 VRET sessions with the C2Care virtual environment.
The first 4-5 sessions on relaxation, cognitive therapy, and craving management can be conducted in groups of 2 to 5 patients. The group sharing effect, the feeling of not being alone with one's problem, and the different viewpoints are very constructive for therapy. Some patients even spontaneously help each other and exchange contact information.

This, knowing that it remains variable depending on the patient and their pathology. In general, follow-up consultations will be useful for contact, monitoring, and relapse prevention every 3 to 6 months during the first year. It seems necessary at first to ensure that the addictive disorder is not of organic origin. Look for a history of neurological pathologies (mental retardation, hydrocephalus, chronic subdural hematoma from head trauma, epilepsy, ischemic stroke, encephalitis, etc.) that could cause hypo-frontality or excessive stimulation of the reward system (nucleus accumbens); perform a clinical examination for neurological signs if necessary. The presence of proven signs should lead to a request for a biological assessment and a brain scan or MRI. Sometimes in psychiatric services, we examine patients who have undergone many forms of therapy for years without success, when ultimately the pathology at the root of the mental disorder is somatic, and a simple medical treatment can solve the problem in a few weeks. It is indeed futile to persist in psychotherapy on a patient who presents a mental disorder of organic origin, as the treatment will then be medical-surgical. During the first interview, after establishing the reason for consultation, the functional analysis for CBT therapists, a study of parental relationships for psychoanalysis, verifying the diagnosis, the patient's goal and motivation, it is important to provide information on psychoanalysis, CBT, the modalities of therapy, the number of sessions, their duration, follow-up, and stages.

Here are the steps of the method in this manual (Derived from CBT and the author's experience):

- Hygienic-dietetic rules
- Psychoeducation
- Relaxation
- ACARA (emotion management technique including craving)

- Cognitive therapy (cognitive restructuring)
- Behavioral and cognitive strategies
- Positive self-instruction
- Self-assertion
- Mental Imagery
- Virtual Reality Exposure Therapy with the C2Care software
- Follow-up

Note that the patient is not required to use all these methods but only those that correspond to them or those they like. Indeed, some of them will not always be effective depending on the patient's tastes, preferences, and personality. Therefore, it is normal for the patient not to use all these tools after the end of the therapy.

• Hygienic-dietetic rules

They involve simple advice on lifestyle habits. Here are the recommendations to give to your patients.

a. Resuming Endurance Sports

Practicing an endurance or "cardio" sport is highly recommended: running, cycling, swimming, fast walking, etc. Indeed, the practice of endurance sports alters the secretion of certain neurohormones in the brain, and these changes have a beneficial effect on mood, pleasurable behaviors, and the reduction of anxiety and hostile behaviors. Notably, serotonin, which is increased by physical activity. It is thus advised to practice sports at least 2 to 3 times per week. Consistency is preferred over intensity: 20 minutes of biking every day is better than 2 hours of biking on Sunday only.

b. Stopping Other Stimulants

Excessive coffee and alcohol tend to worsen anxiety due to their stimulating effects. The patient should drink decaffeinated coffee and consume alcohol moderately (1 to 2 glasses of red wine per day ideally and a few excesses occasionally).

c. Exposing Yourself to Sunlight

Like the practice of sports, exposure to sunlight alters the levels of neurohormones in our brain in a beneficial manner, particularly serotonin, which is involved in the improvement of mood, behaviors, and the reduction of anxiety. It is, therefore, advised to expose oneself to the sun by walking outdoors in forests or parks, going to the beach, or near rivers (with sunscreen and in a reasonable manner).

d. Having Frequent Sexual Intercourse

In hominids like humans, reproductive behavior, which is less necessary due to overpopulation, has evolved towards an erotic behavior because it provides intense pleasure that can be shared. Sexual intercourse is key to bodily intimacy as well as emotional and physical closeness between the two partners in a couple. They produce positive feelings and reflect the quality of the relationship between the two partners. Moreover, the orgasm obtained after sexual intercourse is responsible for the production of endorphin and oxytocin which, in addition to the induced pleasure, help to soothe conflicts and sexual tensions, lighten worries, and consequently decrease anxiety or dependency. The beneficial effects of orgasm not only have short-term consequences but can actually last at least a week after the intercourse. Ultimately, it is therefore recommended to have regular sexual intercourse (at least 2 to 3 times per week).

• Psychoeducation

Psychoeducation is based on three models from biological, neurological, cognitive, and behavioral sciences. Patients should be taught these three models using diagrams and clear explanations. This teaching should be illustrated with concrete cases using the patient's history or stories from other patients.

a. Tobacco

Tobacco addiction is characterized by the inability to control tobacco consumption behavior despite negative consequences (physical, financial, familial, and social). Chronic smoking is responsible for many long-term diseases,

with unfavorable or disabling outcomes (lung cancer, cardiovascular disease, chronic respiratory disease, etc.).
Indeed, 4000 components have been identified in tobacco smoke, some of which are toxic, and 60 are recognized carcinogens. These include:

- CO, a toxic gas also found in car exhausts.
- Tar, which is carcinogenic and coats the lungs with a viscous substance.
- Acetone, a substance also present in nail polish remover.
- Hydrogen cyanide (used in gas chambers)
- Heavy metals (lead and cadmium) toxic to the brain (lead poisoning).

Moreover, tobacco contains nicotine. This compound acts on brain function and disrupts the pleasure and reward system.
Regarding epidemiological records on a larger scale, the problem of smoking concerns the world and specifically Europe, with a daily smoking prevalence of 28% among adults over 15 years old. Europe has the highest daily smoking prevalence in the world among women (20%).
In France, according to the latest records from the National Institute for Prevention and Health Education (INPES), this figure is not much different from European data, with a prevalence of 28.7% for daily smokers over 15 years old, or 13.5 million individuals. This institute also noted an increase in this figure between 2005 and 2010 (26.9% and 28.7% respectively); it mainly concerns women.

b. Alcohol

Alcohol addiction, or alcohol use disorder, is manifested by excessive and uncontrolled alcohol consumption despite negative consequences on physical, mental, social, and professional health. Alcoholism is one of the main causes of morbidity and mortality worldwide, with a wide range of consequences from liver diseases, cardiovascular disorders, to impacts on mental health like depression and anxiety.

Alcohol abuse can also lead to physical dependence, characterized by withdrawal symptoms when reducing or stopping consumption. These symptoms can include tremors, anxiety, nausea, hallucinations, and in severe cases, seizures and delirium tremens.

Alcohol dependence not only affects the individual but also has a significant impact on families and communities, increasing the risk of domestic violence, road accidents, and work-related issues. Risk factors include genetics, social and environmental influences, mental health issues, and patterns of alcohol consumption.
Epidemiologically, the World Health Organization (WHO) reports that millions of people worldwide suffer from alcohol-related disorders. The prevalence varies by region, but alcoholism remains a major public health concern in many countries, including developed countries where access to alcohol is easy and socially accepted.

c. Cocaine

Cocaine addiction, like tobacco addiction, is a severe dependence that deeply affects individuals' lives in terms of health, social relationships, finances, and profession. Cocaine is a central nervous system stimulant that increases dopamine levels in the brain's reward circuits, leading to high levels of euphoria. However, this increase is followed by a sharp drop, leading to repeated consumption to avoid the discomfort of coming down, which promotes addiction.

Health-wise, cocaine can cause immediate and long-term damage. In the short term, consumption can lead to heart attacks, strokes, and seizures in some individuals, even from the first use. In the long term, chronic cocaine use can lead to cardiovascular diseases, respiratory problems, neurological issues, and psychiatric disorders such as anxiety, paranoia, and schizophrenia. Cocaine is also associated with risky behaviors increasing exposure to HIV and other transmissible diseases.

Cocaine contains several toxic substances and cutting agents that can be harmful. Although less studied than tobacco smoke components, adulterants and contaminants found in street cocaine, such as levamisole (a deworming agent that can cause severe blood disorders) and other substances, can cause additional damage.

Epidemiological data show that cocaine use prevalence varies significantly from one region to another, with higher consumption in parts of America and Europe. The European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) reports that cocaine is the most consumed illicit stimulant drug in Europe, with millions of users each year.

In France, according to the French Monitoring Centre for Drugs and Drug Addiction (OFDT), cocaine is the second most consumed illicit drug after cannabis. Surveys indicate an increase in cocaine use, with significant impacts on public health and emergency services.

d. Cannabis

Cannabis addiction, also known as cannabis use disorder, is characterized by an inability to stop or control consumption despite negative consequences on health, social life, or professional and educational responsibilities. Although often perceived as less dangerous than other substances, regular cannabis use can lead to significant health problems and potential dependence.

Health-wise, chronic cannabis use is associated with risks of mental disorders such as schizophrenia, especially in individuals with a genetic predisposition. It can also exacerbate symptoms of preexisting disorders like depression and anxiety. Physically, cannabis can affect the respiratory system, similar to tobacco smoke, increasing the risk of bronchitis and other respiratory infections. Studies also suggest a link between regular cannabis use and impaired memory, attention, and cognitive function, especially when use begins in adolescence.

THC (tetrahydrocannabinol), the primary psychoactive compound in cannabis, acts on the brain by binding to cannabinoid receptors, thus influencing the reward system and leading to psychological dependence. Immediate effects include altered perception, mood, and consciousness, while long-term use can decrease motivation and lead to a state of apathy, known as the amotivational syndrome.

Epidemiologically, cannabis is the most consumed illicit substance worldwide. According to the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA), cannabis plays a prominent role in drug consumption habits in Europe, with millions of annual users, especially among young adults. In France, cannabis

use is also the most widespread among illicit drugs, with particularly high prevalence among teenagers and young adults. The French Monitoring Centre for Drugs and Drug Addiction (OFDT) reports that cannabis use among young people is a major public health concern, with implications for mental health and overall well-being.

e. Other Drugs

Drug addiction, whether opioids, amphetamines, ecstasy, or other psychoactive substances, presents a major challenge to public health. These substances affect the brain and behavior, leading to deep physical and/or psychological dependence, difficult to overcome without help.

Opioids (heroin, morphine, fentanyl): These drugs are particularly addictive and associated with a high risk of fatal overdose. They cause intense euphoria, followed by rapid tolerance, requiring increasingly larger doses to achieve the same effect. Health consequences include infections, respiratory problems, and mental disorders.

Amphetamines (methamphetamine, ecstasy): These stimulants increase energy and alertness but can lead to severe cardiovascular problems, psychotic disorders, and severe dependence. Ecstasy, or MDMA, is often used in festive contexts and can cause dehydration, exhaustion, and emotional disturbances.

Hallucinogens (LSD, magic mushrooms): Although the potential for physical dependence is lower, these substances alter perception and can lead to intense psychedelic experiences. Risks include panic attacks, flashbacks, and psychological disorientation.

The prevalence of these substance uses varies by region and demographic groups but represents a global concern. Treatment efforts include behavioral therapy, psychosocial support, and sometimes the use of medications to alleviate withdrawal symptoms and facilitate recovery.

f. Neurobiological Model of Addiction

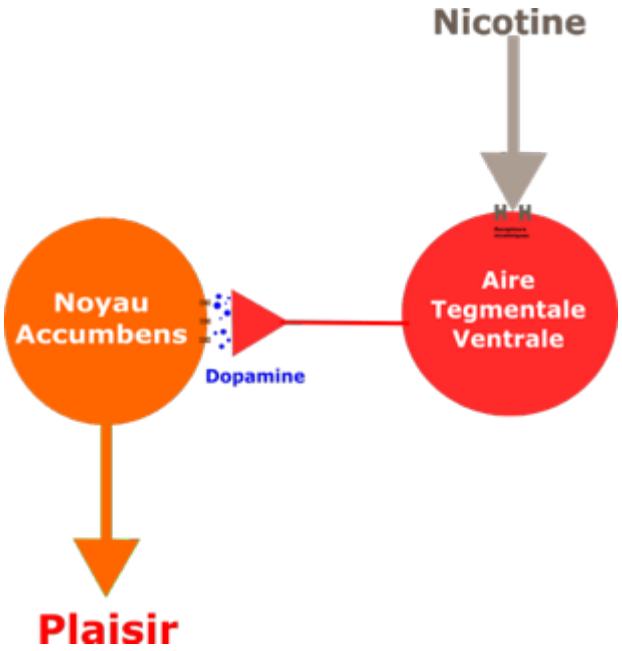
The reward/reinforcement system, also called the hedonic system, is a fundamental functional system of mammals, located in the brain. This reward system is essential for survival, as it provides the motivation necessary for performing adaptive actions or behaviors, preserving the individual and the species (seeking food, reproduction, avoiding dangers...).
Specifically, the reinforcement system consists of three components:

1. **Affective**, corresponding to the pleasure caused by a reward, or the displeasure caused by punishments; (Neurotransmitter: opioids including endorphins).
2. **Motivational**, corresponding to the motivation to obtain a reward or avoid punishment; (Neurotransmitter: Dopamine).
3. **Cognitive**, corresponding to the learnings generally achieved through conditioning (prediction, associations, representations linked to pleasure).

The reward and pleasure system is constituted by the mesolimbic system. This mesolimbic system is formed of dopaminergic neurons of the midbrain (neurons that synthesize dopamine as a neurotransmitter). Their cell bodies are located in the ventral tegmental area (VTA) and their axons project to the nucleus accumbens (a nucleus very involved in the reward system) as well as the olfactory tubercle, the frontal cortex, and the amygdala.

Psychoactive substances act on this system, which is normally activated by sensory signals. Natural signals are found, for example, in the appreciation of music: if a person enjoys listening to music (auditory stimulus), they will want to listen to this music again to reproduce the sensation of pleasure. It allows positive reinforcement as we will see in the conditioning model below.
Thus, our rat friends pressing a lever to deliver cocaine will do so increasingly to the point of no longer feeding themselves. However, if the mesolimbic dopaminergic fibers are damaged by injecting a 6-hydroxydopamine type toxin only into the nucleus accumbens, this lesion will eliminate cocaine self-administration behavior.
These nuclei, particularly the VTA, can be activated by stress, hence the desire to consume and the risk of relapse after stress.

Withdrawal also causes activation of the amygdala responsible for anxiety reactions, which explains the stress caused by withdrawal that also pushes towards relapse.



Relapse can thus be attributed to:

1. A new consumption that reactivates the brain's reward processes.
2. Stress.
3. Contextual cues (situations associated with tobacco, parties, meetings, etc., see conditioning below).

Emotion and behavior regulation is conducted by the frontal cortex, particularly the prefrontal cortex. However, with the duration of dependence, these structures become less active: a phenomenon known as hypofrontality, indicating neuroadaptation. The frontal cortex manages executive functions, motivation, working memory, attention, and behavioral inhibition through its glutamatergic projections to the VTA and the nucleus accumbens. The individual will thus regulate their emotions and behavior less, resulting in impulsivity and compulsion. Moreover, these frontal circuits are immature in adolescents, hence their vulnerability.

g. Conditioning Model

This model is based on the conditioning theories of Pavlov and Skinner's operant conditioning. In the experiments of Pavlov and Bekhterev, which revolve around the

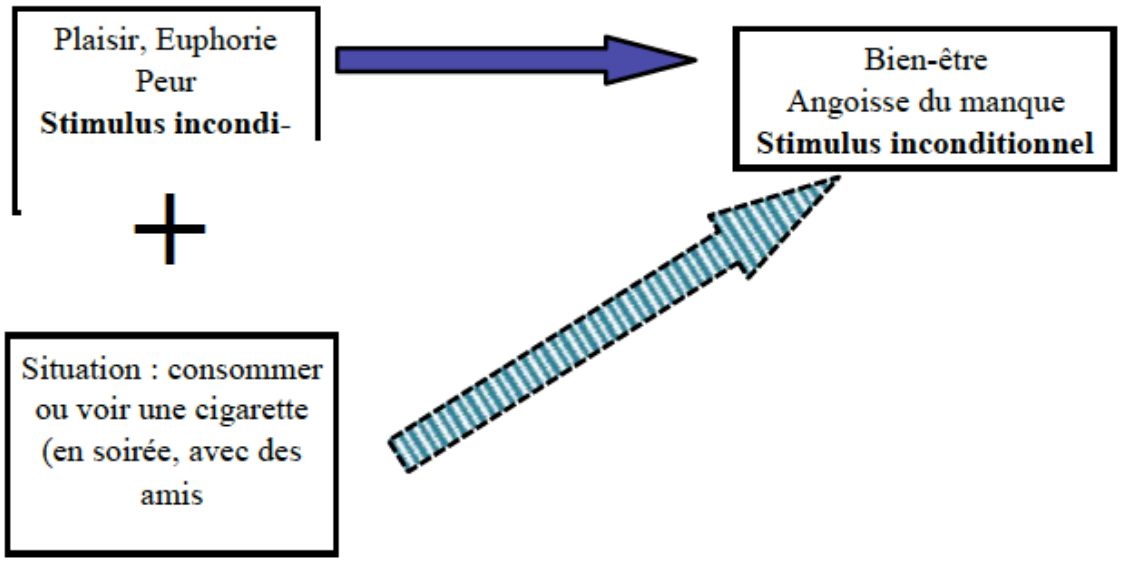
stimulus-response concept. Regarding Pavlov, his famous works were initially conducted on dogs; they would induce a salivation response (unconditioned response) by presenting food (unconditioned stimulus). They introduced the notion of conditioning by associating, with the presentation of food, the sound of a bell which, after repeated experiments, ended up provoking the unconditioned response of salivation alone (without the unconditioned stimulus, i.e., without food) (see diagram below).

In the context of addictions like tobacco, the theory posits that addiction results from the fortuitous or intentional association of a neutral conditional stimulus (the actions of tobacco consumption, drinking a glass, snorting a line of cocaine, ...) with an unconditioned stimulus (most often pleasure or euphoria but it can also be the fear of lacking) producing an unconditioned response (well-being but sometimes also anxiety linked to withdrawal). Consequently, this unconditioned response of well-being will manifest later in response to the neutral stimulus (the product) even in the absence of the unconditioned stimulus (pleasure) hence the fact of consuming more out of habit than the initial pleasure. The resulting behavior then appears inappropriate to the situation because it produces a reaction of well-being through the use of an addictive toxic product: the learning is de facto built on a pathological mode. Other modalities of this model (conditioning extinction, discrimination, generalization, overgeneralization) also apply.

Ex: A patient attends a party, and that day, she decides for the first time to accept a cigarette because she feels a bit sad due to a recent breakup. She will experience a certain pleasure in smoking and feels more focused and active. She will remember these euphoric effects, the object that caused them, and the situation in which it occurred. So, parties and cigarettes will be fortuitously associated with this episode of pleasure, and the patient will begin to develop a desire to smoke in social settings. Later, this can generalize to all forms of social situations (bar, restaurant, dinner at home). This mechanism is classic and frequently observed in consultation. When the association with the pleasure of the cigarette extends to other situations over time, we speak of the generalization of addiction.

Thus, to the physical pleasure that causes initial physical dependence upon consuming the first cigarettes is added a temptation to start smoking again during a quite long period after the disappearance of the physical dependence.

This is then referred to as psychological dependence.



In other terms, actions are reinforced by their consequences. A behavior that results in positive or pleasurable consequences will be repeated and thus reinforced.

It should be explained to the patient that the idea is that any behavior that brings pleasure will be repeated, while any behavior that leads to suffering or lack will be abandoned.

Thus, in the case of a smoker, the relief (therefore a positive emotion) caused by avoiding withdrawal is a positive reinforcer of the behavior, and the absence of anxiety resulting from withdrawal is a negative reinforcer. Relieved, the patient will develop the conditioned habit of smoking and not engage in abstinence.

In conclusion, the more a smoker consumes, the more they will maintain their dependence in the future. By smoking, they feel happy in the short term but worsen their dependence in the long term.

h. Cognitive Model of Relapse

Cognitive models are based on information processing theories.

A situation always requires some form of analysis or evaluation before an action. However, the environment around us is too rich for our attention to focus on all the sensory details of a place at once. Thus, the patient will use their attentional processes selectively to focus only on certain characteristics of the environment (furniture, spaces, animals, objects, cars, size, buzzing, speed, etc.).

Attention will thus be guided by cognitive schemas, which correspond to organized entities or beliefs influencing the perception of events and, de facto, the interpretation of a situation. Past experiences during childhood have led to the development of these beliefs or cognitive schemas, which will be stored in long-term memory and thus lead the patient to focus on the information they expect from a situation.

In summary, they will play a major role in interpreting the situation by selecting certain details (doors, crowd, gaze, etc.) and not others.

If these beliefs or cognitive schemas are erroneous, as is the case in addictions, those concerned are those of danger and vulnerability, they can lead to the selection of details related to the effect of the cigarette or its abstinence (powerlessness, failure, brief relief, disappointment, lack of efficacy, etc.). This inappropriate selection will lead to an unrealistic interpretation of the situation, resulting in erroneous thoughts about the cigarette, similar to those of many patients suffering from anxiety disorder. Here are examples from real people received in VRET consultation, these erroneous thoughts about the cigarette must be simple and generally written in the near future or simple future tense:

Thus, what makes the patient dependent or anxious is their own interpretation of the situation, not the situation itself.

Erroneous Thoughts (from Marlatt & Gordon)		Emotions
Minimizing Thoughts	Today is a party; I can smoke a joint, tomorrow I'll quit. One isn't a big deal.	Pleasurable: Pleasure, well-being
Maximizing Thoughts	I had a drink, it's all ruined. I should have never done it. I'm powerless against the craving.	Unpleasant: Emotional discomfort, Discouragement

Positive Anticipatory Thoughts	I'm going to have a good time.
Relieving Anticipatory Thoughts	I'm going to relax. I'm going to calm down.

Permissive Thoughts	One little cigarette isn't really a big deal. I've earned it!
Facilitating Thoughts	I can join them outside without smoking.

- **Vagal Relaxation**

a. Preparation

Outside of any episode of anxiety, preliminary training in relaxation is useful to familiarize oneself with the techniques, to get into the habit of applying its principles, and subsequently to use them effectively in situations of stress or intense anxiety.

- To practice, choose a quiet place where you know you won’t be disturbed. The lighting should be dim, so it is advised to train in semi-darkness if possible.
- Turn off your mobile phone.
- Free yourself from tight clothing (bodice, shoes, girdle, bra, bun, etc.) and loosen belts and shirt collars.
- It is preferable not to have consumed a heavy meal immediately before (pörkölt, Christmas log, mooncake, dorayaki, borscht, etc.)
- You can either lie down or simply sit to practice.

b. The Method

This is the simplest and quickest method to use during episodes of moderate or intense anxiety; it is easily acquired and often highly appreciated by patients.
The patient can lie down or simply sit to practice.
Ask them to place their hand on their abdomen to really feel their belly.
Inspiration phase: the patient inhales and, by doing so, extends or inflates their abdomen (hence the hand placed allows the patient to check that their abdomen is expanding).

Expiration phase: the patient exhales gently while relaxing their belly without forcing. They take this opportunity to relax their shoulders or neck.
Then again, the inspiration phase, etc.
There is no rhythm or counting to do. To avoid any form of control, the patient breathes at their own pace without counting.
This method allows, by the depression created in the abdomen, an increase in the diameter of the inferior vena cava inducing a reduction in the inflow rate to the left atrium of the heart and a stimulation of the vagus nerve producing a slowdown in heart rate. Thus, the patient has the possibility to voluntarily decrease their heart rate.

- **ACARA**

ACARA is an acronym, explain that each letter of ACARA signifies the term of a technique to help them remember it more easily and to use it during episodes of strong temptation (craving) in any situation during exposure in virtual reality or in reality.

a. A for Accept the Craving Emotion

Reminder: Craving is a strong, intense, and fleeting emotion that drives a person to consume a product. It occurs in response to contextual cues (parties, presence of other consumers, viewing the product in media, etc.).
Controlling emotions as well as fighting, combating, or attempting to master one's anxiety or desire only causes, worsens, or maintains the anxiety of withdrawal or the emotion of craving. It is thus essential for the patient to choose to accept this craving emotion by abandoning any idea of control, struggle, resistance, and mastery. It is necessary to emphasize this notion of choice because it is not at all about passive resignation. The patient must let the emotions or anxiety come to them without trying to control it. They must accept it because it is part of them just like their hands or legs. Accepting the sensation of craving allows it to exist and leave without judgment from the patient: "I let it come and I let it go" "I know it's harmless because it's part of me."
Anxiety can be compared to a wave in the sea, at the water's edge. If one stands up against the wave, it will knock us over. This controlling action is therefore futile. If, on the other hand, instead of standing against it, we turn around and dive with it,

the wave then pushes us to the shore. Thus, one must glide with the craving like a wave...

b. C for Contemplate one's emotions

As in the cognitive therapy table (see the homonymous chapter), the patient must contemplate and evaluate the intensity of their craving emotions from 0 to 100. They follow them over time, assessing and noting their fluctuations with a detachment akin to an external observer.
By doing so, it helps them to gain perspective on these emotions, but most importantly, it reminds them of a very useful fact: that the desire to consume can be strong but it is always temporary or fleeting. There is a beginning and an end.

c. A for Act with anxiety

During a craving episode, the patient should continue the action they had started. They must act as if they were not anxious. Their activity may be slower or more rigid, but they must continue. This shows that even under the effect of craving or anxiety, one can still be organized. Former consumer patients tend to believe that the desire to consume is irresistible and throws their mind into chaos, preventing them from acting. They prove the opposite by acting even when feeling the desire to consume.

There are two rules to help the patient act with desire:

- They should only perform one task at a time. During VRET, the therapist can help the patient focus on the current action.
- When performing actions, it is imperative to slow down movements, to break down and multiply gestures to carry out their action efficiently, even if the desire is present and urges the patient to hurry.

d. R for Repeat these 3 steps once again

The patient should repeat the steps of accepting the craving, contemplating the craving, and acting with the craving once again.

e. A for Anticipate the best

Clarify to the patient that their anxious thoughts being unrealistic, what they fear will not happen. De facto, they should expect the best: the craving will cease, their friends will appreciate them, the plane will land, they will not get sick, the metro will reach its station, their anxiety will pass, they will arrive home, etc.
The patient should instead surprise themselves by managing anxiety or craving. As long as humans live, they will have anxiety or desires. It is magical thinking to believe that one can get rid of craving like a disease. Using ACARA, thus, puts one in the right emotional disposition to accept the desire if it arises.

• Cognitive Therapy: Cognitive Restructuring

a. First Step: Self-Observation

Initially, it is necessary to observe and describe the situation during which the desire to consume appears
WHEN? Where? WITH WHOM? HOW?
Ex: "I am at a party with friends, and one of them offers to go out and use substances."
List the different possible causes leading to a relapse and the SUDs (Subjective Units of Distress):
EXTERNAL CAUSES (place, people, situation):

- Conflict
- Specific situations (varied trigger stimuli: coffee, phone, car, routine activities...)
- Pleasant moments or situations associated with consumption behavior
- Family meals/Party/Birthday
- Controlled consumption
- Weight gain

INTERNAL CAUSES (FEELINGS, EMOTIONS, IMAGES, THOUGHTS)

- Acute stress (anger, painful life event)
- Negative emotional state
- Depressive period with negative images (I'm worthless, I'm going to be alone, etc.)

- Anxious period with catastrophic images (I'm going to lose my job, my spouse will leave me, my children will be sick, etc.)
- Relational difficulties
- Sadness, Boredom
- Positive emotional state
- Loss of motivation

Assess the emotion and the level of craving on a scale of 100.
Ex: satisfaction, pleasure, agreeable craving 60/100

Look for related erroneous thoughts as a form of self-observation. It is useful to do this as soon as the craving arises. It is therefore important to report and identify the type of erroneous thoughts or reasoning errors about the situation to find one's real need or true desire:
Erroneous thoughts should be simple and generally written in the near future or simple present tense:
"A cigarette will make my evening better."
"Just one line will get me in shape."
"I've smoked one, I'm going to relapse."
"I won't be able to say no to a drink."
"The cigarette will calm and relax me, I'm going to need it."

b. Second Step: Evidence Searching

Be your own detective by looking for evidence, the pro/con technique.

After listing the unrealistic beliefs, invite the patient to transform into a detective (they can choose anyone they like: Sherlock Holmes, Nicky Larson, Detective Dee, Inspector Gadget, or any other famous investigator) and gradually lead them through the dialogue to understand their role as a keen investigator: to search for concrete evidence or facts.
So, after self-observing their thoughts and false beliefs as well as the emotion, the next step is to search for facts that support (evidence for) or refute (evidence against) their false beliefs or thoughts (like I will relapse, I can't say no, etc.).

Thus, we look for arguments "for" and "against" these thoughts.
Look for objective arguments, derived from the analysis of facts, that support my thoughts and false beliefs: evidence for

Ex: I've relapsed twice before. Past experience.
I feel a strong desire to smoke
In the past, I've had difficulty saying no

Also look for indisputable facts that go against my thoughts or false beliefs: evidence against

Ex: I've been able to say no in the past as well.
A true relapse is not consuming once but consuming more and more closely until one resumes their former consumption rate.

I can't control my emotions, but I can control my behavior and engage in another activity (go out, change places, work, do relaxation exercises, drink tea, play video games, etc.).
The effect of craving is intense but temporary.

c. Third Step: Generating a Balanced Interpretation

The final phase following the evidence search involves the patient in abstinence formulating alternative, more realistic thoughts concerning the craving or the relapse-risk situation.
The patient may sometimes imagine what they should think if they were another person. However, it seems useful to help them structure this more realistic thought to bring it forth.
The development of alternative thought is established by reminding the patient:

- **To recognize their emotions**

When one is in a situation that induces anxiety or triggers a panic attack, it's not about being in denial by saying "everything is fine" but rather recognizing the presence of the desire to consume, which, in any case, is not dangerous as

explained in the psychoeducation chapter. One can then say to oneself, "It's true, I have a desire to consume, I feel it, it's a bit hard, it's quite difficult, etc."

- **To look for the opportunity in the situation**

The risk situation such as a party, work stress, an argument, a coffee break, etc., represents an opportunity for the patient to practice the methods they have acquired in the field. Like a swimmer who has trained for months in preparation for the Olympics or a runner who has rigorously exercised to participate in a marathon, a relapse-risk situation for the patient represents the moment to apply everything learned during therapy. The patient should thus see themselves as a champion prepared for this challenge.

- **To briefly review the evidence AGAINST**

This simply involves briefly reviewing the evidence against (and only against) listed in the previous part (searching for evidence).

- **To formulate the advantages of the situation**

This aspect is different from the opportunity. The patient must realize how facing the situation is an advantage for them.
Ex: By showing that I can manage craving and the situation on my own, by not consuming I maintain good health, I don't encourage others, I save money, I can instead treat myself or buy gifts to please others.

- **To conclude on a realistic future**

The patient's erroneous or distorted hypotheses and thoughts being unrealistic (I've smoked one, I'm going to relapse, I won't be able to say no, etc.), they will therefore not occur in reality. What the patient fears will not happen. What will unfold is simply what is most probable or evident: my friends will understand if I don't consume because they like me, I relax with relaxation exercises, I can say no by explaining my approach, etc.

Ex:

Situations	Erroneous Thoughts	Realistic Alternative Interpretations

I'm at a party with friends, and one of them suggests going out on the balcony to smoke a cigarette.	I won't be able to say no. Smoking will give me a boost. One little cigarette won't hurt me. I'll disappoint them if I refuse.	It's true, I feel the urge to smoke, it seems a bit challenging, but it's an opportunity for me to practice therapy and relaxation in this situation. I slept well, so I'm fairly energized; I can take the time to rest later. My friend understands if I refuse because it's for my well-being. We joked about the topic, I manage to do something else like talk, focus my attention on my breathing, or have a drink. I know that the craving is temporary like a wave, I can wait for it to pass. Eventually, I will have had a great time laughing with my friends, enjoyed a good drink, made some acquaintances, gone home, and will be proud of myself.

- # Behavioral and Cognitive Strategies

a. Strategies for Coping with Temptations

- **Avoidance**: Initially, avoid temptations as much as possible to prevent risky situations that might lead to a relapse, especially in the first weeks of withdrawal. (Parties, moments of relaxation, avoiding coffee initially…)
- **Substitution**: Replace the trigger stimulus for the desire with another stimulus (for example, the association of coffee/cigarette at the end of a meal --> replace coffee with another hot drink like tea, herbal tea…)
- **Change**: Modify the triggering situation (context): Have your coffee in a different place, in a different cup, at a different time…
- **Escape**: This technique applies when you have not been able to avoid a risk situation, so escaping appears as a good strategy. (Taking a break during a

stressful meeting to reduce stress; During a party, leave the room, go out for fresh air…).

- **Distraction**: Make a list of distracting activities you can do during an "urgent craving." It's important to make the list in advance so you don't have to think about how to occupy your time at the moment of the "urgent craving." Distracting activities can be cognitive or behavioral. Goal: By passing time occupied with something else, you allow time to observe that after a while, the desire decreases and passes. It also allows time to recall all the disadvantages of taking.
- **Delay**: Waiting when the "urgent craving" appears, allowing us to realize that the desire quickly diminishes and disappears after a few minutes.
- **Exposure to risk situations**: After practicing the other strategies multiple times and when well-trained in all methods, you can start to expose yourself to the craving situation but without consuming. Reinforcement, self-satisfaction, pride, and increased self-efficacy will follow.

b. Adaptive Behavioral Strategies

- **Relaxation**: Vagal relaxation as seen in session 1.
- **Physical Activity:** Physical activity is often used as a substitute. Doing gym, surfing, running, cycling, swimming, windsurfing, brisk walking, cleaning, or gardening can help reduce tension. Moreover, physical exercise engages you in an activity incompatible with the simultaneous performance of the smoking behavior.
- **Alternative Consumption**: Celery, carrot, popcorn. Drinking tea and coffee are good substitutes if they weren't part of the "smoking routine." Sucking on slowly dissolving candies (tic-tac, gums, cachou…) or chewing on pens, straw, and toothpicks.
- **Assertion Skills**: The ability to refuse to participate in an activity centered on the addiction in question.
- **Brief (and pleasant) Activity**: Hugging, a cool drink, a kiss, marshmallow, a massage, consuming a fruit, brushing teeth, a bath in the sea or bathtub…
- **Support**: Talking to a support person. This will be your "bodyguard." Talk to them about your problems, ask them to motivate you not to resume by talking about the advantages, engage in an activity with them (sports,

games, dance, hug if it's your partner). This help will be collaborative; you must help them in turn on one of their activities.

Ask the patient to choose 5 strategies that seem most suitable to their personality and difficulties.

● Positive Self-Instructions

To maintain the dialectic aspect of therapy, ask the patient what slogans are.
Slogans observed in our society are quite simple, impactful sentences repeated ad infinitum. Their purpose is to push individuals or masses to adopt a specific behavior: choice and purchase of a product for commercial slogans, voting for a candidate for electoral slogans, adoption of a dogma for political propaganda slogans. Provide some examples.
Thus, therapeutic slogans: positive self-instructions. The patient cannot control their emotions or thoughts, which is normal (they must accept them), but they can control what they say to themselves because self-talk is a voluntary behavior.
The patient can use them by reciting them in their head or recalling them either during a craving episode or when hesitating to face a risky situation in virtual reality during Virtual Reality Exposure Therapy (VRET), in imagination, or in reality. This moment when the patient makes this choice is the critical decision time.

Here are 15 from the literature (Beck) and my experience, but everyone is free to add new ones:

- I don't want to consume.
- I have to get going.
- I breathe better if I stop consuming.
- I don't know until I try.
- I need to take risks.
- I must surprise myself.
- Consuming contaminates everything (hair, clothes, house, car).
- I am strong enough to overcome this.
- I must regain my freedom.
- I must conquer this place.
- The force is with me.

- Craving is always temporary; it will pass.
- I am doing myself good by not consuming.
- I am protecting my loved ones' health by not consuming.
- The cave I enter contains the treasure I seek.

Out of these 15 phrases that the patient has meticulously noted, they must choose at home the 5 that best match them or that they like the most. These should be written on the back of the cardstock (type bristol) they used for the phrases from the ACARA system (see ACARA chapter). They must always have them on hand to use in difficult virtual and real situations or when under the effect of the craving, they have forgotten the content.

● Self-Assertion

Being able to express what one feels, experiences, or needs; While respecting what others feel, experience, or need.

a. Knowing how to say no / Knowing how to refuse

How to refuse:

- Practice active listening, that is, listen and if necessary ask for clarification on the request.
- Direct and precise verbalization of the response
- Using the broken record technique
- Making a “self-disclosure,” knowing how to use one's emotions and feelings. Negative emotions (“I'm sorry, don't take it the wrong way but…”) as well as positive (“I'm happy to see you”)
- Empathic ADS (Assertiveness, Decision-making, and Self-control), knowing how to put oneself in the other's place. Primarily communicate to the other what one understands of their position, their problems, and then verbalize our response, opinion, request, or feeling in a second moment.), alternatives and compromise and negative self-assertion can also be used.
- End warmly

The last two points are especially used when the interlocutor is sensitive, or the response given is difficult for them. Be careful to check not to justify, deviate, or explain too much, otherwise, the refusal may become very difficult.

b. Different Techniques to Use

The "broken record" technique

- Knowing how to persist
- Repeat the same thing without getting upset, always more amicably
- Do not deviate or justify

Do not justify

- Do not look for too many excuses or give reasons
- Indeed, giving too many reasons diminishes the clarity of the message because it gives the interlocutor additional arguments for discussion or "the stick to beat oneself with
- Your word is enough because you are an adult

Do not deviate

- Do not get drawn into a subject unrelated to the discussion's object: this leads to a loss of message clarity and harms the sought-after objective

Do not over-explain

- While explanations are often useful and necessary
- Over-explaining harms the message's clarity and generally leads to justification and deviation
- It's better to provide information rather than explain

Correct Erroneous or Dysfunctional Thoughts

- My refusal will upset, hurt, it might be very important for the other that I accept.
- If I refuse, they will resent me, have a bad opinion of me, no longer like me.
- If the other reacts badly to my refusal, shows sadness or anger, what then? I will be at a loss.
- If they are asking me this, it must be important; I cannot refuse, others' needs come before mine.
- Is it worth refusing?

These thoughts must be banished, as they are false. Replace them with more realistic thoughts.

• Mental Imagery

It consists of a set of methods aimed at using imagination to better manage anxiety.

Positive substitution

During an anxious episode, it involves substituting catastrophic thoughts with pleasant memories from the patient's past. Childhood memory, teenage events, adult life memory. The patient must live this experience as a true reminiscence of their past. They must involve all their senses in this time travel: what they see, hear, smell, what they feel under their feet, the position of their body, what they feel on their skin, etc.

Symbolic image

The patient is asked to imagine an object that will reassure them in an anxiety-inducing situation. The patient must therefore visualize an imaginary object in a real place. This object is related to the theme of their fears and catastrophic thoughts.

Imagining a positive future

The goal is to visualize an immediate or distant future with a realistic outcome. With two possibilities: visualizing a near future and visualizing a distant future.
In the near future mode, the patient is invited to project themselves imaginatively into the minutes or hours following the anxiety-inducing event they are facing.
Ex: on the plane, the patient visualizes their arrival, landing, the cabin hatch opening, exotic air entering the cabin, the faces of their friends waiting for them, etc.
In the distant future mode, the patient imagines themselves in a few years in the same situation. They see themselves comfortable on the plane, metro, highway, in front of a public. They see themselves indifferent and relaxed in these situations, no longer paying attention to all the signals they used to watch (doors, exits, vents, windows, glances).

Imagining escaping a greater danger (with humor)

With a certain form of humor and derision or using cinematic references, the therapist suggests the patient imagine what could be more catastrophic than their fear and which would prompt the patient to face the situation they avoid.

Imagining a role model

The core idea is to suggest the patient imagine that in the very real situation is a person they love or admire and who reassures them: the model. This imaginary character can be a spouse, a friend, a relative, whether alive or not, or even a person the patient does not know personally like an actor or a hero from manga, comics, or graphic novels. Once again, emphasis is placed on involving all senses: the patient must visualize the appearance of the person, their face, their voice, their perfume, their touch.

Altering reality in a funny or positive way

In this last modality, the patient is free to partly or wholly alter the reality of the faced situation to make it amusing or pleasant. They can change people, the place, details of the environment, sounds, etc.

• Virtual Reality Exposure: The Main Principles

Once the patient has mastered the various methods outlined above, they can then expose themselves to virtual and then real environments. Behaviorist models derived from conditioning theories have shown that the sought effect is a form of habituation to anxiety-inducing stimuli with the aim of achieving fear extinction.

a. Warning

As specified at the beginning of this work, the phase known as exposure to virtual environments or 3D events with a VR headset should only be carried out after training patients in the therapy methods chosen by the therapist (CBT: cognitive-behavioral therapy, psychoanalysis, relaxation, mindfulness, emotion management, etc.). Without this training, the patient risks experiencing a relapse or intense craving without knowing how to manage the overwhelming emotions. This could result in a counterproductive relapse.

b. Progressive

The patient should start the exposure by facing the easiest environments for them from the list they have established: they must specify all the relapse risk situations they are exposed to and rank them by difficulty based on the intensity of the craving perceived in the situation.
For virtual reality, simply ask them to rank the available virtual environments by difficulty.
This hierarchy in exposure, both in reality and virtual reality, is important because it should not be abrupt. It should provoke enough anxiety or craving but at a reasonable level. If it were too intense, the patient would not be able to apply the methods effectively as they would be overwhelmed by anxiety.
The patient progresses at their own pace from one situation to another. When the patient's craving has dropped to 0 or to 10-20 out of 100 after one or several sessions in the same environment, it's a sign they can move on to the next.
This notion of progression remains true even within a single real or virtual situation (if configured this way). A single situation can thus be broken down into several sub-steps to facilitate progression (simple bus stop then bus stop with someone offering a cigarette, for example).

c. Prolonged

Since craving is a transient phenomenon, its reduction can only occur if the patient remains in the situation for a long time (more than 5 minutes and ideally more than 15 minutes).
They will see for themselves that in the dreaded places the craving always eventually subsides. However, for the patient to stay in a real or virtual place avoided (coffee break, public airplane, etc.), it should not be too anxiety-inducing or too difficult, hence the interest in step-by-step progression as mentioned above.
To help them stay in a relapse risk situation, the patient can practice the therapy methods detailed in previous chapters (relaxation, ACARA, cognitive therapy, etc.), they can also engage in free dialogue for the purpose of seeking associations and evocations of repressed thoughts for psychoanalysis.

d. Repeated

Learning, regardless of the subject, often involves a concept of repetition. Exposure, being a form of learning to get used to, practice, and see differently, patients are advised to train several times a week in virtual reality and then progressively in reality.

In virtual reality, the patient should choose a step of the virtual environment to expose themselves to (going to a bar, driving on a road with traffic jams, approaching characters consuming, etc.). Once this step is chosen, the patient confronts it repetitively during the same session or from one session to another.

Any exposure in virtual reality as in reality that has been carried out is a successful exposure. The patient should not be in search of a form of perfection or expect excellent academic results. Having the courage to face the situation and stay there is in itself a great success.

e. The Stages of a Session

The patient will have previously benefited from preparation in CBT or psychoanalysis over several sessions.

Explain the operation of the VR headset to the patient and any adjustments they may need to make. Show them the space they have in your office or practice to prevent them from bumping into surrounding furniture.

Launch the chosen virtual environment with the patient, starting with the easiest and therefore the least tempting in terms of the desire to consume, from the list of situations established with them (see the progressive paragraph above).

Ensure the patient has enough space around them (at least 4m²) to move and turn. They will also tend to walk or move spontaneously.

Place the VR headset on the patient's head. Give them time to adjust it properly.

The patient can now begin their virtual reality exposure under your supervision. Initially, let them familiarize themselves quietly with the equipment and navigation mode. Once they have mastered its operation, you can now suggest they start their exposure: "you can enter the building," "the elevator is to your right," "open the door," "enter the hallway," "walk towards the crowd," etc.

The patient should be encouraged to act, but they must not be forced; it's up to them to choose their action. Once anxious, ensure they practice the therapy methods detailed in previous chapters.

At key moments, regularly ask the patient to specify their craving level from 0 to 100:

- From 0 to 30, they can continue to evolve in the situation.
- From 40 to 60, they must stop their progression and stay in place to practice the therapy methods detailed in previous chapters.
- From 70 to 99, the craving level is too high, invite them to go back to an easier situation or position.

A dialogue can certainly be established between the therapist and the patient during exposure:
PATIENT: "I feel like I want a cigarette here, what should I do?"
THERAPIST: "What's your craving level?"
PATIENT: "50"
THERAPIST: "Good, in that case, stop where you are, and what can you do here?"
PATIENT: "Breath relaxation"
THERAPIST: "Good, let's do it together"
PATIENT: "I feel a bit better, what should I do next? I forgot"
THERAPIST: "Start talking to me about the ACARA system, you like that system, I believe"
PATIENT: "Yes, so the first A stands for accepting the craving, I shouldn't control or fight; I should..."
THERAPIST: "Good, now deploy the strategies and review how to say no."
[...]

At the end of the exposure, the patient's craving level should be low (0 to 30).
Finally, discuss their actions in virtual reality, their progress, and compliment them. Then set the date for their next appointment and suggest, after the 3rd VRET session or more, to expose themselves in reality following the same principles and methods as in virtual reality. Emphasize once again the progressive nature of exposure. The patient must expose themselves step by step, starting from the beginning, progressing at their pace, and not skipping steps in the hierarchy.

f. Cybersickness Syndrome

It could be translated as cyber-induced malaise, cybersickness, or simulator sickness. It represents all the functional signs secondary to the use of virtual reality equipment in some patients.

It resembles eye strain and seasickness. The symptomatology mainly consists of a sensation of instability, dizziness, nausea, or rare vomiting, eye fatigue, a sensation of a veil in front of the eyes.

Therefore, if the patient experiences nauseous symptoms during a VRET session, they are advised to slow down their movements, turn their head less quickly, and take breaks every 5 to 10 minutes. This bothersome phenomenon for therapy sometimes occurs during a first trial. The syndrome frequently diminishes over the sessions.

• Transition to Reality: Generalization

Follow-up will take place starting from the last virtual reality therapy session. It is then advisable to schedule a session every two or three months for a year. This follow-up ensures that the patient correctly applies the methods over the long term and offers reassurance to the patient.

In the real world, after one or two VRET sessions, they will apply the same rules as for exposure in virtual reality (progressive, repeated, and prolonged). It is up to them to construct the steps of the hierarchy in exposure to relapse-risk situations for good progression. There are always steps you can remind the patient of: time (Go to a party for an hour then leave, stay 5 minutes near colleagues who are consuming, short car journeys, cigarettes kept distant, etc.), training in refusing to consume, exposure accompanied or not by a supportive person, time of day (morning, evening), etc.

Training between and after sessions is crucial:

Tell the patient that: "10% of the therapy is at the hospital or office and 90% is outside."

If the patient feels they are regressing, it is often just a perception linked to their mood or a difficult period in their life. This can be induced by an unrelated external event (exam, death, separation, etc.). It is advisable to explain to the patient that mood varies over time and there are periods when a person is more in shape and others when they are less energetic. This state impacts the patient's perception of

their exposure in reality or virtual reality. Emphasize the normal aspect of this variation from one day to the next. There is no regression but an evolution that is always there, provided the patient trains regularly and practices exposure in real life.

In their training in both virtual and real life, the patient, when exposing themselves, should not always seek a form of performance. It is not a personal exam. Simply doing the exposure is enough to succeed. The only failure is when the patient does not expose themselves, especially when they need to expose themselves on their own between therapy sessions.

● Conclusion

Ultimately, the goal is to offer and teach patients a variety of tools to better manage the desire to smoke and their impulse: the craving. The aim will be to reach the cognitive click that will allow them to reconceptualize their environment. Their vision will then generate more realistic and reassuring thoughts about abstinence and the risk situations associated with the consumption of the addictive substance. Exposure will enable them to gain greater self-confidence combined with a sense of pride and self-satisfaction. They have indeed overcome a challenge that once seemed impossible to them. This will be their personal achievement and the guarantee of constant evolution in their life.

Furthermore, the patient is not obliged to use all the tools written here. That is precisely the interest of providing several. Clinical observation has shown that they will prefer some to the detriment of others they will not use, which is a completely normal process. Allow them the freedom to exploit therapy and make it their own as long as it is effective and beneficial for them.

Optional Reading

If you wish to access further knowledge and deepen your understanding of therapeutic tools further, you can consult the following works:

- Soigner les addictions par les TCC. P Graziani & L Romo. Ed. Elsevier Masson.
- Cognitive therapy of substance abuse. AT Beck, FD Wright et al. The Guildford PressNew York
- Maintenance strategies on the treatment of addictive behaviors. Marlatt, GA. et Gordon, JR. The Guildford Press- New York